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OWNERSHIP AND USE OF FOREST LAND IN THE REDWOOD – DOUGLAS-FIR SUBREGION OF CALIFORNIA

ADON POLI and
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OWNERSHIP AND USE OF FOREST LAND

IN THE REDWOOD--DOUGLAS-FIR SUBREGION OF CALIFORNIA

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U. S. DEPARTMENT OF AGRICULTURE

Forest Service, California Forest and Range Experiment Station

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FOREWORD

Ownership as it relates to the use of forest land is still a relatively new field of research. But it is generally recognized that knowledge of the type and size of forest land holdings and of the owners of this land is essential to persons or agencies concerned with decisions as to forest policy and management. This report presents detailed information on ownership of forest land in the Redwood--Douglas-fir subregion of California.

This information was obtained from a cooperative ownership study established by the Forest Service and Production Economics Research Branch, Agricultural Research Service (formerly part of the Bureau of Agricultural Economics). The major purpose of this cooperative arrangement was to obtain in detail information pertaining to ownership of forest land and to integrate this information with timber resource data obtained by the Forest Service under its National Forest Survey. Combination of these data with other economic facts will provide a sound basis for formulating policies and plans for the management and use of forest lands.

Detailed analysis of the correlation of these ownership facts with forest management practices actually found on the various ownership holdings in this study is the logical next step in this field of research. Such an analysis would include a detailed evaluation of protection from fire, insects, and disease, cutting practices, stand improvement, restocking, and other measures associated with management of forest land.

Some of the information concerning ownership in this release was published in separate Forest Survey statistical reports for several counties in this subregion. These counties are Del Norte, Humboldt, Mendocino, Sonoma, Santa Cruz, and San Mateo. A report similar to this was published for the Coast Range Pine subregion.

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OWNERSHIP AND USE OF FOREST LAND IN THE REDWOOD--DOUGLAS-FIR SUBREGION OF CALIFORNIA

SUMMARY AND CONCLUSIONS

The area covered by this study consists of 7,048,000 acres of forest, range, and farm-forest land in a long narrow strip along the northern California coast. Three-fifths of this is commercial forest land, which carries a net saw-timber volume of 137.6 billion board feet, principally Douglas-fir and redwood.

About three-fourths of the land is privately owned. The other fourth is public land, mainly national forest.

The bulk of the commercial forest land is in the northern part of the area, extending from about Sonoma County northward to the Oregon border. Most of the large-scale timber operations are centered in Humboldt and Mendocino Counties, the leading lumber-producing counties in California in 1951. These large-scale operations are primarily in the redwood timber zone near the coast where the land is used almost exclusively for commercial timber production. Forest land in this redwood zone is generally in large, reasonably well-blocked private ownerships. These large holdings possess the timber stands necessary for good forest land management.

Along the fringes of the redwood timber zone and in various localities within it are numerous small scattered holdings with timber on them. Some of these are used primarily for farming, recreation, and residence; but most are left unused and unattended by their owners. In the strictly commercial timberland areas of this zone, the presence of many small holdings interspersed among larger holdings generally complicates management of forest land for timber production. Many diversified ownerships, scattered settlement, and increased fire hazard are some of the factors that affect management. Furthermore, owners of small timber tracts are usually unfamiliar with timber management techniques, and many are nonresidents who live too far from their properties to give them proper attention.

Only a relatively small acreage of redwood forest is in Federal ownership. The unusual scenic values of the redwood groves as tourist attractions and their desirability for recreation have resulted in the establishment, from former private timber holdings, of a number of State-owned redwood parks. These parks provide much needed public recreation grounds for the constantly expanding urban population of this State. Future acquisition of additional redwood groves for State parks is anticipated. Recreational use of redwood forest land in these parks and in some of the private holdings along the main highways is a highly desirable use.

East of the redwood timber zone much commercial forest land in private ownership lies intermingled with grass and woodland-grass areas. Some large blocks of commercial forest land are in national forests.

Commercial forest land in this eastern timber zone grows mainly Douglas-fir. Ranching and farming are major uses of the privately owned land. The land in public ownership is used principally for timber production. Timber operations here are generally on a smaller scale than in the redwood zone, and some are conducted as enterprises secondary to ranching, farming, and other land uses. On the average, ownerships here are smaller and the patterns of land ownership and land use more complex than in the northwestern redwood timber zone. These ownerships have been acquired and are used for many different purposes, and the owners' interests are principally in nontimber uses of the land. Consequently, a large percentage of the timberland acreage is not managed for timber production. Clearing timberland for grazing purposes is a common practice on the ranch holdings. These clearing operations, however, are not always successful in producing grass because some of the soils in the cleared areas are better adapted to producing timber. In recent years the increased demand and resulting high prices for Douglas-fir have slowed down the clearing of timberland for grazing.

In the southern part of the study area, from about Mendocino County southward to Monterey County, commercial forest land tracts are interspersed with areas of grass, woodland-grass, and farm land. Recreation, residence, and farming are major uses of the land. Timber operations are usually on a small scale, and many are conducted as enterprises secondary to farming, recreation, residence, and other land uses. Patterns of ownership and land-use are complex here. From 80 to 90 percent of the land owners have holdings smaller than 180 acres. These small holdings average about 54 acres. About half their land is commercial forest land. Redwood and Douglas-fir are principal timber types.

The large urban population of the San Francisco Bay area exerts a strong pressure on the nearby forest land for small recreational and residential holdings. This persistent demand has established recreation and residence as major uses for much of this land. There is evidence that more and more rural land (agricultural as well as forest) will go into these types of land use. The ownership pattern of small forest-land holdings is appropriate for this southern area because the main objective of management is to hold the trees for their aesthetic values rather than to produce timber.

For the study area as a whole, there are several ways in which the overall pattern of land ownership and use might be improved. Complex patterns of small scattered holdings in strictly timber-producing areas, as in certain parts of the redwood timber zone, might be simplified by consolidating some small holdings in such a way that ownership will not be an obstacle to efficient timber management. Continued sale of some of these small properties will help this consolidation. Voluntary exchange of land is another possibility. The feasibility of handling some of these tracts on a cooperative basis, either as a private undertaking or as a public service, might also be explored. Acquisition of forest land for agriculture in commercial forest areas should be discouraged by agencies and individuals concerned with farm programs, especially when production of timber has been established as the best use of the land.

In forest areas where ranching and farming have been established as the principal use of the land, as in the Douglas-fir timber zone on the eastern slopes of the Coast Range Mountains, farm-forestry programs might be expanded to better integrate small-scale timber enterprises with the agricultural activities of the ranch and farm ownerships. Educational programs to point out the economic benefits of good forest-land management on ranches and farms might be sponsored by both public agencies and private groups.

Where recreation and residence have been established as major uses of forest land, as in the southern part of this study area, it would be desirable to provide for the orderly and planned development of future recreational and residential sites. One way to accomplish this is through the active use of local planning boards or similar organizations. Zoning is also useful in preventing undesirable patterns of settlement.

PHYSICAL AND ECONOMIC SETTING

The Redwood--Douglas-fir subregion of California lies on the Pacific Coast in the northwestern part of the State. It is a long narrow strip of land, ranging from 20 to 50 miles in width from the coast to its eastern boundary and extending from the Oregon-California State line southward to Monterey County. As defined by the Forest Survey, this subregion incorporates a total land area of 7,578,000 acres and includes all of Del Norte, Humboldt, Sonoma, Marin, San Francisco, San Mateo, and Santa Cruz Counties plus parts of Siskiyou, Mendocino, and Santa Clara Counties. Forest, range, and farm-forest land amounts to 7,048,000 acres. All figures and comments in this report relate to this acreage only (fig. 1). The 530,000 acres excluded are agricultural, urban, industrial, and other intensively developed lands outside the study area.

Its redwood forests have brought the subregion international fame. Almost half the timber-producing land is occupied by redwood stands. Only here do coast redwood trees[1] grow in their natural state. These trees are unequaled for their great size, height, and age. The average redwood tree is about 6 feet in diameter, and some trees have been found to exceed 20 feet in diameter, 350 feet in height, and 2,000 years in age. An unusually favorable combination of species, soils, topography, and climate has resulted in heavier stands of timber in the redwood forests than are found anywhere else in the world.[2] The majestic beauty of the virgin

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1/ Redwood (Sequoia sempervirens /D. Don/ Endl.) is here distinguished from giant sequoia (Sequoia gigantea /Lindl./ Decne).

2/ Fritz, E. Redwood, the Extraordinary. The Timberman, 30(7): 38. May 1929. Fritz says: "Acres have been found on river flats that ran as high as one million board feet, and this figure was exceeded in scaling the logs cut on a sample acre on the Larabee Flat cut within the present decade, and doubtless can be exceeded on other selected areas still standing. The average of course is much less, but is still as high as 90,000 to over 100,000 board feet per acre over considerable areas, even on the slopes."

stands, the enormous volumes of timber, the great size and age of the individual trees, and other unusual characteristics of the redwood all contribute to its world-wide renown.3/

Douglas-fir trees are found throughout the entire subregion. They grow in pure stands and mixed with redwood, pine, and other species. In recent years, Douglas-fir--like some other "white woods"--has become an important source of commercial timber in this forest area.

Most of the subregion is generally hilly and mountainous, but in the central and southern portions are several fairly large interior valleys. The Coast Range Mountains extend north and south over practically the entire length of the area. This range is not a single continuous chain of mountains but is made up of several irregular ridges oriented northwest to southeast, with deep narrow valleys between. Some mountain peaks rise to altitudes of about 7,500 feet.

Several large streams drain westward into the Pacific Ocean. The largest of these are the Klamath and Eel Rivers in the north, and the Russian River in the south. Other rivers of import in the study area are the Smith, Trinity, Mad, and Mattole.

The climate for much of the subregion is characterized by mild temperatures during most of the year; heavy winter rainfall; and dense coastal fogs in spring, summer, and early fall. Extremes of temperatures in the greater part of the subregion range from about 20 degrees in winter to about 90 degrees in summer. Rainfall varies considerably throughout the subregion with differences in elevation and distance from the coast. The average annual precipitation ranges from about 20 inches in the south near Monterey County to about 100 inches in the north near the Oregon border. Precipitation is principally in the form of rain but some snow occasionally falls on the higher mountain ridges.

Although precipitation occurs mainly from November through April, the coastal redwood belt is kept humid during the rest of the year by frequent dense low coastal fogs which penetrate deep into the redwood forest at night and in early morning. These heavy nocturnal fogs apparently are a requisite for redwood growth, because few redwood timber stands are found beyond the reaches of the coastal fog belt.

The natural resources of the subregion include timber, grass, farm land, minerals, fish, game, and water. Richest of these are the heavy stands of timber, principally redwood and Douglas-fir. For many years these stands have supported an active lumber industry which provides employment for a large segment of the subregion's populace. They also furnish the raw material from which numerous items are manufactured for the benefit of users everywhere. In addition, the aesthetic values of the redwood forests attract a large tourist trade and thus indirectly contribute substantially to the employment and income of the local people.

3/ Shirley, James C. The Redwoods of Coast and Sierra. 1-84. Univ. of Calif. Press. Berkeley 1942.

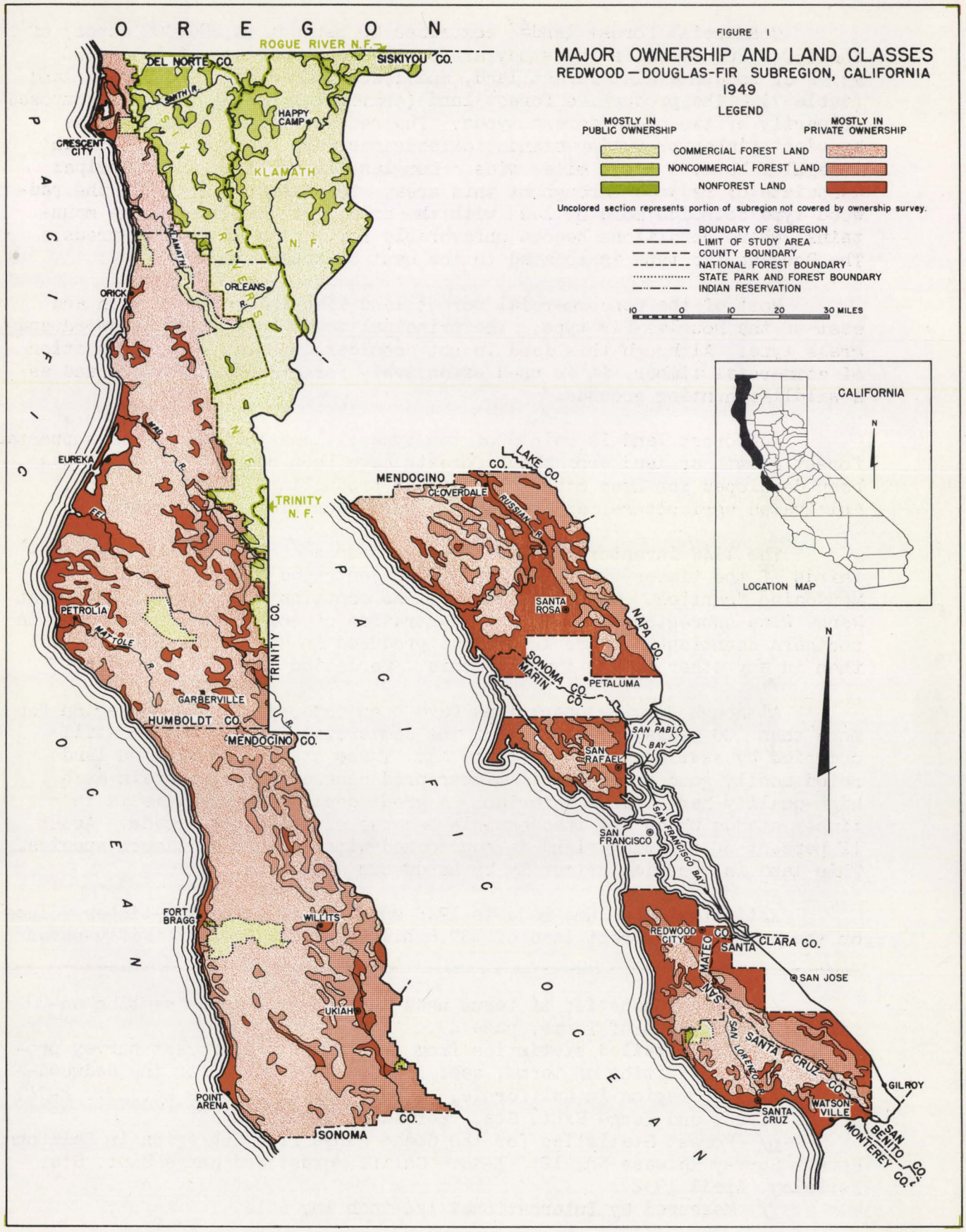
FIGURE 1
MAJOR OWNERSHIP AND LAND CLASSES
REDWOOD—DOUGLAS-FIR SUBREGION, CALIFORNIA
1949
LEGEND
MOSTLY IN PUBLIC OWNERSHIP
MOSTLY IN PRIVATE OWNERSHIP
COMMERCIAL FOREST LAND
NONCOMMERCIAL FOREST LAND
NONFOREST LAND
Uncolored section represents portion of subregion not covered by ownership survey.
BOUNDARY OF SUBREGION
LIMIT OF STUDY AREA
COUNTY BOUNDARY
NATIONAL FOREST BOUNDARY
STATE PARK AND FOREST BOUNDARY
INDIAN RESERVATION
10 0 10 20 30 MILES
CALIFORNIA
LOCATION MAP
OREGON
ROGUE RIVER N.F.
DEL NORTE CO.
SISKIYOU CO.
SMITH R.
HAPPY CAMP
CRESCENT CITY
KLAMATH
KLAMATH R.
N. F.
ORLEANS
ORICK
TRINITY
EUREKA
MAD R.
EEL R.
TRINITY N. F.
PETROLIA
MATTOLE R.
GARBERVILLE
TRINITY CO.
HUMBOLDT CO.
MENDOCINO CO.
FORT BRAGG
WILLITS
UKIAH
POINT ARENA
SONOMA CO.
MENDOCINO
LAKE CO.
CLOVERDALE
RUSSIAN R.
SANTA ROSA
NAPA CO.
SONOMA CO.
MARIN CO.
PETALUMA
SAN PABLO BAY
SAN RAFAEL
SAN FRANCISCO
SAN FRANCISCO BAY
REDWOOD CITY
SAN MATEO CO.
SANTA CLARA CO.
SAN JOSE
SAN LORENZO R.
SANTA CRUZ CO.
GILROY
WATSONVILLE
SANTA CRUZ
SAN BENITO CO.
MONTEREY CO.
PACIFIC OCEAN
N

Commercial forest land[4] comprises 60 percent (4,238,000 acres) of the 7,048,000 acres in the study area. The rest consists of 1,522,000 acres of noncommercial forest land, and 1,288,000 acres of nonforest land (table 7). The productive forest land (commercial forest land) is composed primarily of two broad forest types. The redwood type, containing the heaviest timber-producing stands, extends eastward from the coast in an irregular belt, 5 to 30 miles wide. Douglas-fir grows as the principal associate of redwood throughout this area. The eastern limits of the redwood type coincide more or less with the crests of the Coast Range mountains, where conditions become unfavorable for growth of redwood trees. The Douglas-fir type is located to the east of these ridges.

Most of the noncommercial forest land lies intermingled with and east of the Douglas-fir type. The principal cover is a mixed hardwood and grass type. Although this land is not considered suitable for production of commercial timber, it is used extensively for grazing livestock and as a wildlife hunting grounds.

Nonforest land is mainly of two types: land that has never supported forest growth or land from which forests have been removed and which has been developed for uses other than timber production, such as grazing, cultivated agriculture, and residential or industrial developments.

The 1948 inventory of the forest resource[5] shows that almost two-thirds of the timber-producing land is concentrated in Humboldt and Mendocino Counties. Humboldt County alone contains 41 percent. The Coast Range Pine subregion also has a concentration of commercial forest land in northern counties.[6] More lumber was produced in Humboldt County in 1951 than in any other county in California. Mendocino County was second.

Although logging operations have been underway in the subregion for more than 100 years, 83 percent of the commercial forest land is still occupied by sawtimber stands (table 1). These stands, growing on lands rated mostly good or better in timber-producing capacity, contain much high-quality harvestable material. A great deal of this volume is in timber stands which are inaccessible because of inadequate roads. About 12 percent of the timberland is nonstocked with commercial timber species. This land is occupied primarily by hardwoods and brush.

Estimates of volume made in 1948 showed a standing saw-timber volume on the commercial forest land of 137.6 billion board feet.[7] Fifty-seven

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4/ For explanation of terms used in this report see section entitled: Definition of Terms, page 49.

5/ For detailed statistics from this inventory, forest survey procedure, and definition of terms, see: Forest Statistics for the Redwood--Douglas-fir Subregion in California. Forest Survey Release No. 19: 1-54. Calif. Forest and Range Expt. Sta. Berkeley, January 1953.

6/ Forest Statistics for the Coast Range Pine Subregion in California. Forest Survey Release No. 12: 1-48. Calif. Forest and Range Expt. Sta. Berkeley, April 1952.

7/ Measured by International 1/4-inch log rule.

Table 1.- Commercial forest land by timber type and by stand-size class, Redwood--Douglas-fir Subregion, California, 1948

Timber type	Total		Old-growth saw-timber stands	Young-growth saw-timber stands	Pole-timber stands	Non-stocked
	Thousand acres	Pct.	Thousand acres			
Douglas-fir	2,005	47.3	934	743	47	281
Redwood	1,918	45.3	727	858	164	169
Pine--Douglas-fir--Fir	266	6.3	140	81	8	37
Fir	39	0.9	17	13	3	6
Pine	10	0.2	3	7	-	(1/)
All types	4,238	100.0	1,821	1,702	222	493
Percent		100.0	43.0	40.2	5.2	11.6

1/ Less than 500 acres.

Table 2.- Net volume of live saw timber on commercial forest land by species and by stand-size class, Redwood--Douglas-fir Subregion, California, 1948

Species	Total		Old-growth saw-timber stands	Young-growth saw-timber stands	Pole-timber stands	Non-stocked
	Million bd. ft.	Pct.	Million bd. ft.			
Douglas-fir	78,968	57.4	49,985	28,201	214	568
Redwood	38,778	28.2	29,100	9,198	240	240
White fir	5,030	3.7	2,146	2,882	2	-
Sugar pine	4,694	3.4	3,490	829	372	3
Ponderosa and Jeffrey pines	2,582	1.9	1,603	979	-	-
Grand fir	1,291	0.9	301	990	-	-
Other softwoods1/	2,668	1.9	1,827	728	113	-
Hardwoods2/	3,542	2.6	1,915	1,314	8	305
Total all species	137,553	100.0	90,367	45,121	949	1,116
Percent		100.0	65.7	32.8	0.7	0.8
Average volume per acre (bd.ft.)	32,457	-	49,625	26,511	4,275	2,264

1/ Includes California red fir, incense-cedar, western hemlock, mountain hemlock, Sitka spruce, western white pine, Port-Orford-cedar, western red cedar, Bishop pine, California torreya, knobcone pine, Brewer spruce, and Pacific yew.

2/ Includes tanoak, madrone, California black oak, canyon live oak, alder, chinquapin, Garry oak, ash, coast live oak, interior live oak, laurel, and maple.

percent of this was in Doublas-fir (table 2) and 28 percent in redwood. Most of the remaining volume was white fir and sugar pine. Most of the total volume was in trees 41.0 inches in diameter and larger. Two-thirds of the redwood saw-timber volume was in this largest diameter class.

The timber resource situation is always changing. Saw-timber volume is constantly being added through growth and removed through logging and natural mortality. In 1948, 39 percent (679 million board feet) more saw timber was removed than was grown. Average annual growth for that year was 1.1 billion board feet, while the output of timber products plus saw timber destroyed or left in the woods amounted to 1.7 billion board feet. The difference between the rate of timber growth and removal is expected to increase in the next few years because of increased cutting of Douglas-fir. A cut in excess of growth is desirable for some time in this sub-region because about two-thirds of the saw-timber volume is in uncut old-growth stands. Old-growth stands generally have high mortality losses and consequently show only little net growth. But the rate of growth should increase after cutting, provided the areas cut are adequately stocked and protected.

Other natural resources are of considerable value. Large areas of grass and woodland-grass throughout the subregion support numerous beef, sheep, and dairy ranch enterprises (fig. 2). Rich farm land in the interior valleys and on the coast grows many valuable crops and supports a large farm population.

Of increasing significance are the recreational values of the forest areas, mountain streams, picturesque and rugged coast line, abundance of fish and other wildlife, and the mild pleasant climate (fig. 2). These recreational features furnish employment, income, and pleasure to many local people as well as pleasure to thousands of outsiders who visit the subregion.

About 0.6 million people actually live in the area of study, but the ownership and use of the forest land are influenced by a much larger number of people who live in adjacent urban areas of the San Francisco Bay region. These people rely on the wood products manufactured in the study area, and visit the forests for recreation. They also depend upon the forests for part of their water supply. The total number of people within this sphere of influence is estimated at about 2.5 million.

Many of the residents of the northern part of the study area are original settlers or descendants of original settlers who were attracted to the region by early lumbering, agriculture, mining, and related activities. A few descendants of original California Indians live on reservations and individual allotments, principally in the central and northern parts of the subregion. The major part of the population of the southern portion is of more recent origin. Increased industrial activity during the war and post-war years has attracted many people from other States.

Transportation facilities for inter- and intra-subregional shipment of freight include truck, rail, ship, and air. Most important of these to the movement of forest products is truck transport. All the counties in

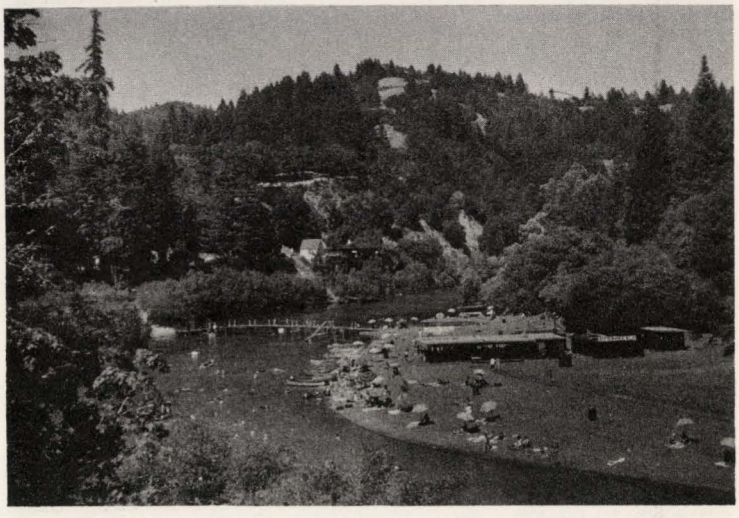

Figure 2.- Large areas of grass and woodland-grass are intermingled with the timber areas and support many livestock ranches throughout the Redwood--Douglas-fir subregion. Richest of natural resources are the heavy stands of timber. They support an active timber industry and provide valuable watersheds. Recreational and watershed values of forest lands are becoming increasingly important to the economy of the subregion.

the area have at least one well-developed public highway--supplemented with many miles of good, locally maintained roads. But there are too few timber access roads. Railroad facilities are most extensive around the San Francisco Bay area. Several railroads--including transcontinental lines--converge on San Francisco from the south and east. Only one railroad operates north of San Francisco and this only into Humboldt County. Del Norte County has no rail transportation. Waterborne freight shipments are handled at several major ports: San Francisco Bay, Humboldt Bay, and Crescent City. San Francisco Bay is one of the world's largest landlocked harbors. Air freight has as yet no specific importance in the shipment of forest products.

Lumbering, livestock ranching, and recreation are the leading industries. Cultivated agriculture, commercial fishing, and manufacturing are important, too, in certain localities.

Lumbering as a major industry began in the area in the 1850's. The first power sawmill was operated in the redwood forests of Santa Cruz County in 1842.8/ This and other early sawmills were driven by water power. Logs were hauled to the mills by oxen, or floated downstream in winter. Later, when lumbering began to develop into a major industry, steam furnished power in logging and milling of timber. Today, after a century of lumbering history, the industry has developed to almost 400 sawmills of a wide variety of types and sizes and capable of producing more than 2 billion board feet of lumber annually (figs. 3-5).

During 1948, the year of inventory of the forest resource, 393 mills produced 1.4 billion board feet of lumber. The 5 largest mills--annual output 50 million board feet or more--produced 22 percent of the lumber output. In contrast, the 140 smallest mills, with annual outputs of less than 0.5 million board feet, produced only 2 percent.

Although the number of active sawmills has changed little since 1948, there has been a marked shift between the production size classes. The number of mills in the medium size classes has increased while the number of very large and very small mills has decreased. In 1948, 38 percent of the active mills had outputs of 1 to 10 million board feet annually. Four years later, 53 percent of the active mills in the study area had annual productions within these limits.

Timber operators manufacturing products other than lumber make a substantial demand on the forests for wood material. The principal products are plywood and veneer, cooperage, posts, shingles, shakes, hewn ties, and other split products. For the most part, these products require a special kind and quality of material. Production of veneer in particular requires logs of the largest size and highest quality. In 1951, 13 plywood and veneer, 3 veneer, and 5 plywood plants in the area converted about 164

8/ May, Richard H. A Century of Lumber Production in California and Nevada. Forest Survey Release No. 20, p. 1. Calif. Forest and Range Expt. Sta. Berkeley, June 1953.

Figure 3.- This is a large sawmill typical of those found on the large timber holdings on the coast. These large mills generally saw 25 or more million board feet of lumber per year. They use principally redwood and Douglas-fir timber. The first sawmill on this site was constructed in 1860 but it burned in 1889. The present mill was built on this same site in 1890. It has operated almost continuously ever since.

Figure 4. This is a small sawmill typical of some recently constructed by forest industries in this area. These mills produce from 1 to 10 million board feet of lumber per year. They saw redwood and Douglas-fir timber mostly.

Figure 5.- This is a small sawmill typical of some of those found on farms, ranches, and small timber holdings. These small mills produce less than one million board feet of lumber per year. Lumber from these small mills is not generally of the highest quality. Much of the lumber is for local use.

million board feet of peeler logs2/ into veneer and plywood. Some logs of poor quality or small size--generally undesirable for other uses--are converted to hardboard at a large pressed board plant located in the subregion.

The timber industry contributes much to the economy of the area, both in jobs and wages for the woods and mill workers and in value of forest products. Using 1951 production as a base, the estimated number of wage earners engaged in logging and milling operations in the study area is about 21,000. Including the families of these workers, that part of the population directly dependent upon the timber industry is about 89,000 persons. This is about 15 percent of the estimated total population of the study area.

Many others provide the timber industry workers and families with goods and services. These persons operate local independent enterprises. They are supported either partially or totally by persons engaged in lumbering and related industries and are therefore economically dependent upon the timber industry. This service population--including both workers and their families--is estimated at nearly 180,000 persons.

Either directly or indirectly, 269,000 persons are dependent on the timber industry. This is about 45 percent of the estimated total population of the study area.

The 1951 payroll of wage earners in the timber industry is estimated at $95,000,000. This figure does not include the service populace income for the same period. The value of products produced is difficult to determine because prices vary so much by species and by kind and quality of product. At average prices, the total value of forest products (f.o.b. mill) for 1951 has been estimated at about $200,000,000.

Changes within the timber industry--such as the increase or decrease in the number and size of mills--and changes in management policies of the members of this industry will affect the type and size patterns of land ownership in the study area. Forest land will be bought and consolidated into large holdings to provide for continuous or expanded operations. Or, large holdings will be broken up and sold as a consequence of inheritance provisions, speculation, or for other reasons. Part of the land acquired for new operations will be owned and operated by nonresident owners who seek timber supplies for current operations located elsewhere, or for new supplementary mills in the study area.

Ranching and farming are important activities of the subregion's economy. Predominant types of farming are livestock ranching, dairying, poultry raising, and growing deciduous fruits, nuts, and grapes.

The livestock ranches, mainly cattle and sheep, were established when the land was originally patented by the first settlers. Most of them

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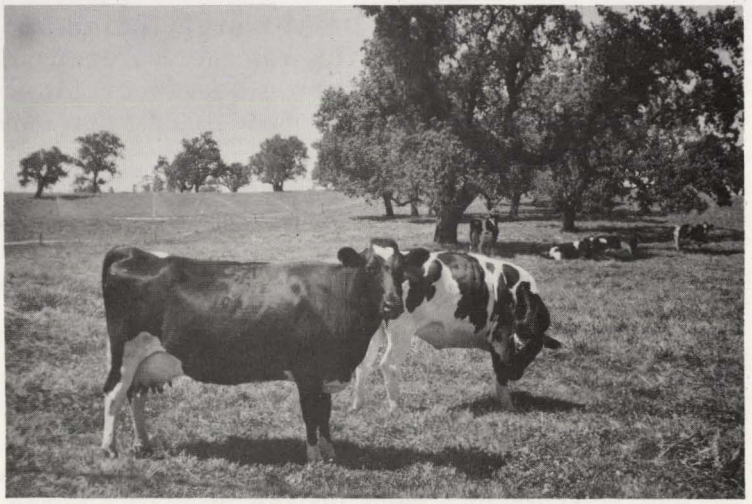
2/ A peeler log is a log suitable for the manufacture of rotary cut veneer.

Figure 6.- Apples, grapes, and other fruits are grown successfully in small valleys, natural openings, and on certain cut-over land in the forest area. Dairy farms are mostly on or near the coast.



are in Mendocino, Humboldt, and Sonoma Counties. In contrast to livestock ranches elsewhere in the State, most of the herds are nonmigratory. The ranch units generally provide yearlong feeding, with some supplementary feed from outside sources in years when local feed conditions are poor.

Dairy farms are located mainly on and near the coast in Humboldt, Del Norte, Sonoma, Marin, and Mendocino Counties. Dairy herds utilize the natural grassland pasture supplemented chiefly by feed grown on the farm. Dairy farms in the southern part of the subregion usually have larger acreages of range land than do those in the northern part, principally because soils and climate in the southern coastal area generally favor the growth of grass over other competing types of vegetation.

Principal fruit crops of the subregion are prunes, grapes, apples, and pears (fig. 6). These fruits are grown on small intensively developed areas located mainly in the interior valleys of the central and southern parts of the subregion. The grapes are used principally for the manufacture of wines.

Poultry farms are found throughout the subregion, but most are concentrated in the Petaluma commercial poultry district of Sonoma County. Hens are raised chiefly for the eggs they produce.

The recent rapid increase in population in this State, shorter working hours, improved transportation facilities, and increased tourist trade have stimulated demand for use of forest and other rural land for recreation. Recreation, as a dominant use of forest land, has become particularly significant in counties near the San Francisco Bay area. This recreational demand is indicated partly by the rather large number (almost 3,000) of owners who have acquired wooded land specifically for this purpose. Recreational activities contribute materially to the local economy and to the general welfare of many people.

OWNERSHIP IN RELATION TO USE OF LAND

Before the Spaniards came to California, Indians used the land for hunting and fishing and for growing the few native crops necessary for their sustenance. These people had few or no direct ties to the land but moved about in search of game and other food. Private ownership of land by individuals was unknown to them.

During the Spanish era, which began in the latter part of the 18th century, private ownership generally took the form of large tracts of land granted to Spanish settlers by the Spanish and Mexican Governments. These Spanish grants were made in the southern and central parts of the subregion as far north as Mendocino County. Although the Spanish settlers acquired land principally for grazing livestock, some of the grants in this area contained timberland as well as some good farm land. Most of the agricultural land in the grants was later subdivided into smaller tracts and sold to new settlers. But some of the timberland remained in fairly large holdings even after the land grants were broken up. The metes and bounds

pattern of ownership formed by these Spanish "ranchos" is still a peculiarity of land records of several counties in this area.

When the United States acquired California from Mexico in 1848, all the land in the State, except for certain private claims such as pre-existing Spanish land grants, became part of the federal public domain. This land then became subject to disposal under the federal land laws. From that time on, individuals obtained land in this forest region primarily by filing entries with the Federal Land Office as provided by the Preemption, Homestead, and Timber and Stone Acts (enacted from 1841 to 1878).

These general land laws operated under the principle that forest land could best and most economically be developed under individual private ownership and in small units similar to those acquired for agriculture. Thus, the forest land obtained by individuals under these laws was generally limited to 160 acres. Many individuals who obtained land in this forest area sold their timberland shortly after acquisition to lumber companies, promoters, and speculators who consolidated the small tracts into much larger timber holdings. While this practice of circumventing the original land laws led to fraudulent transactions and much speculation,10/ it helped to establish an ownership pattern much more adaptable to forest land management than would have been possible by strict adherence to the provisions of the land laws.

Considerable land in this area was granted to the State by the Federal government. This usually consisted of the 16th and 36th section in each township as well as other land designated by congressional action. Nearly all of this State land was sold subsequently, as provided by law, to individuals, usually in 320 and 640-acre tracts. Funds obtained through the sale of this land were used to finance the development and maintenance of schools and colleges by the State. A few isolated sections remain in State ownership.

The desirability of redwood forests as commercial timber-producing land quickly placed nearly all of the redwood timber acreage in private ownership. Much of the nonredwood timberland in the eastern part of the subregion which remained unappropriated was placed in national forests by presidential proclamations issued since 1905. Some land was set aside for Indian reservations and allotments, and some of the less productive land (about 196,000 acres) still remains as unappropriated and unreserved public domain.

In recent years, a limited acreage of redwood timber land has shifted from private to public ownership through gift and purchase. This land

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10/ Wattenburger, Ralph T. The Redwood Lumbering Industry on the Northern California Coast, 1850-1900. M. A. Thesis. Typewritten. pp. 63-79. Univ. of California 1931.

Also - Hibbard, Benjamin H. A History of the Public Land Policies, pp. 466-7. Peter Smith. New York. 1939.

consists chiefly of State parks and the recently acquired State Forest in Mendocino County. The parks were established to preserve in their natural state some of the remaining spectacular stands of redwood timber.

Public Ownership

This subregion has the smallest acreage of land in public ownership of any major forest region in the State. Public ownership comprises slightly more than one-fourth of the 7,048,000 acres of all land covered by this survey in the study area. This public area includes about one-third of all the timber-producing lands of the subregion (table 7, and figs. 7-9). In the other subregions of the State public agencies control from half to two-thirds of the commercial forest land.11/

The most productive timberlands, that is, lands supporting redwood stands, are primarily in private rather than public ownership.

National Forests

Most of the public forest land is in national forests, principally the Six Rivers and Klamath National Forests. Other national forests represented are Trinity and Rogue River. All together, these forests contain about 73 percent of the total publicly owned land of the subregion and 76 percent of the publicly owned commercial forest land. About three-fourths of this timber-producing land supports stands predominantly of Douglas-fir. Less than 1.0 percent grows redwood timber (fig. 8 and table 8).

Most of the saw-timber volume on the public forest land is in "white woods," principally Douglas-fir. These woods, formerly considered of low value in the redwood area, now compose a leading part of the forest product output of the subregion. Much of the national forest saw-timber volume is in inaccessible areas and in timber stands of lower quality than those in private ownership. Most of the best and most accessible timber had passed into private ownership before the national forests were established. Recently, allowable cuts of national forest timber have been increased and access roads built to permit expanded use of national forest timber. A measure of this expanded use is the increase in receipts from sales of timber between 1948 and 1951. In 1948, sales in the national forests of this subregion totaled $68,000. By 1951, the value of sales increased to $373,000. Although some of this difference can be attributed to increase in prices, most of the change is due to an increase in the volume of timber cut. Increased use of national forest timber will provide a new timber supply for some private operators. These operators may thus establish continuous operations although they lack an adequate supply of timber of their own. Further, proper marking of timber for the increased cut will increase production on the national forest lands by improving the residual stands. Much of the timber on the national forests is overmature and hence subject to high mortality losses if not used. Consequently, net growth on these

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11/ Wieslander, A. E. and H. A. Jensen. Forest Areas, Timber Volumes and Vegetation Types in California. Forest Survey Release No. 4, p. 29. Calif. Forest and Range Expt. Sta. Berkeley, March 1, 1946.

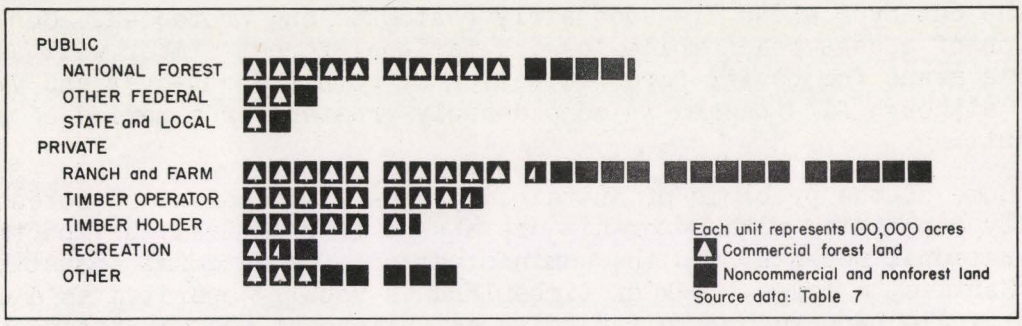

Figure 7.- Total acreage of land, by type of owner.

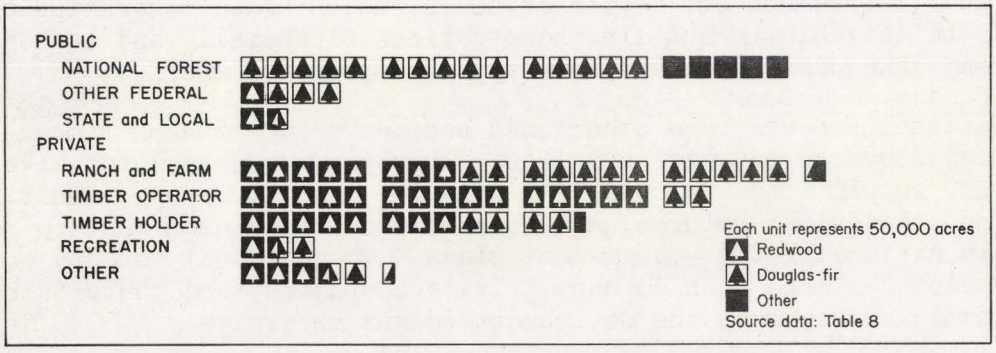

Figure 8.- Acreage of commercial forest land, by type of owner and by major timber types.

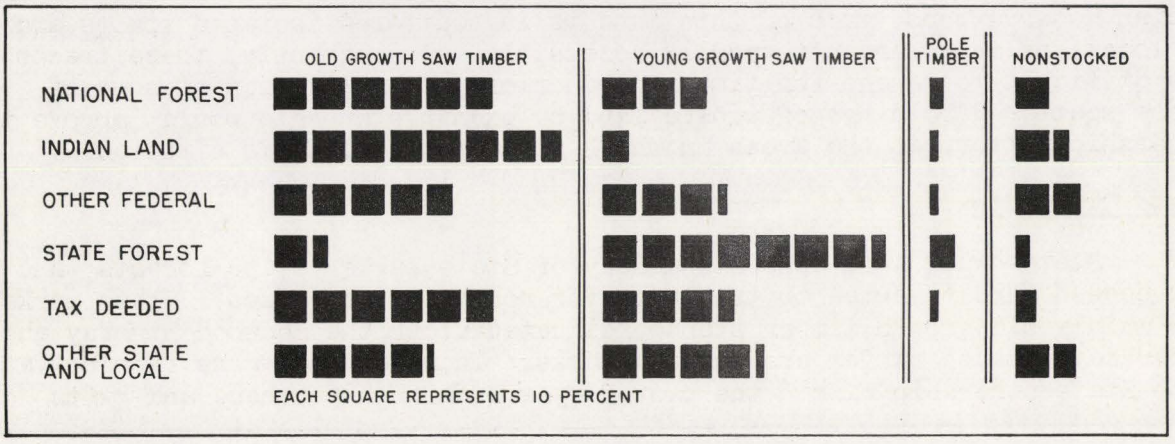

Figure 9.- Percentage of acreage of timberland held by public agencies, by stand-size class.

stands is low. After cutting, the rate of growth should increase, provided the cut-over areas are adequately restocked and protected. Construction of access roads while logging national forest timber will also provide a means for better fire protection of both the cut-over and virgin stands, although fire hazard is considerably greater for a period of years after cutting.

Some of the problems of sustained-yield[12/] management of forest land generally associated with ownership are absent or relatively unimportant in the national forests. In the administration of a national forest by the Forest Service, a large block of timberland is usually operated as a continuous single ownership. This permits establishment and maintenance of the long-run management plan required in growing timber as a crop. The element of size of ownership does not limit management, except on the relatively few small scattered or separated segments of any national forest. Under private ownership, size may be a limiting factor of management because of the existence of many small and scattered holdings. Furthermore, in the process of growing timber crops there may be periods of high costs of protection and improvement but little or no income. Public ownerships are generally better able to sustain these periods financially and to continue good forest management than are some types of private owners.

National forests have other uses besides production of timber. The forests are a source of water supplies. They provide forage for livestock production, supply food and cover for wildlife, and offer opportunities for recreation. Potential returns, and losses, from these uses must be considered in national forest-management plans. The national forests control cutting practices more than do many private operators, and there is usually less economic pressure on the Government to cut excessively.

Other Federal Agencies

Other Federal agencies administer about 16 percent of the publicly owned land. Nearly all of this land is vacant, unappropriated, and unreserved public domain, and land in Indian Reservations and Indian allotments. Almost two-thirds of this is commercial forest land. Except for the Indian Reservations, much of this land is in scattered isolated tracts and in locations which are not readily accessible. Consequently, these tracts are difficult to manage for timber production. Consolidation of some of these scattered holdings of public land by exchange or sale would improve the ownership pattern in the areas in which much of this land is situated.

State Ownership

State-owned land consists mainly of State parks, State forests, and tax-deeded land reverted to the State for nonpayment of taxes. State parks are mainly old-growth timber stands, situated along the Redwood highway and other main roads. A few are coastal parks. This land has gone from private into State ownership within the past 30 years through purchase and gifts

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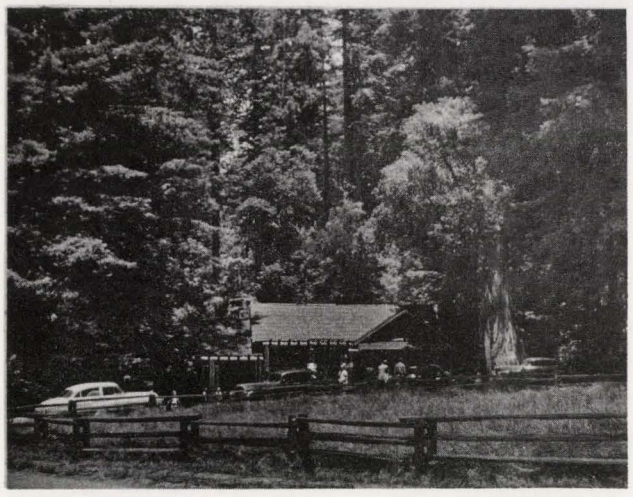
12/ Sustained-yield forestry is defined as the continuous production of annual or periodic forest crops in approximately equal or increasing amounts on a given area of forest land.

Figure 10.- The public forests and parks offer the best opportunity for people who own no rural land to enjoy outdoor recreation. The scenes above and at lower right are in a county redwood park in San Mateo County. The scene at lower left is in a State redwood park in Santa Cruz County. Both of these parks are readily accessible to a large urban population.



from various individuals and organizations like the Save-the-Redwoods League. The parks, which contain some of the finest redwood timber stands remaining in the subregion, have been withdrawn from timber utilization to provide much needed public recreation areas. Preservation of these famed redwood groves in their natural state affords pleasure to thousands of people from all parts of the country and from many foreign countries. Because these recreational tracts are used and enjoyed by so many people, their economic value for recreation undoubtedly exceeds the value of the lumber that could be cut from the timber stands involved. Furthermore, as population expands in the State, the value of these areas for recreation can be expected to increase. Public forests and parks offer the best opportunity for nonowners of rural land to enjoy reasonably unrestricted outdoor recreation (fig. 10). These parks are particularly desirable because of the relatively small acreage of redwood timberland in public ownership. Future plans of the State Division of Beaches and Parks contemplate the acquisition of additional acreages of selected redwood groves in this forest area.

The largest State forest is the Jackson State Forest in Mendocino County. The land in this forest is principally cut-over redwood timberland, but most of it is rather well stocked with young-growth saw timber. Most of this land was bought by the State in recent years from a pioneer timber operating company. Part of it was acquired from the National Park Service. This land is managed by the State Division of Forestry primarily for demonstrational and experimental purposes. It is considered ideal for demonstrating good forestry because it has sufficient acreages of timber stands in the various age classes to permit management on a sustained-yield basis. Use of this land in this way fulfills a special need in this area, because much commercial forest land here is owned by persons who are not in the business of producing timber. Demonstration areas like this forest may stimulate interest in improving the management of the timberland on some of these private holdings.

About 3 percent of the public land reverted to State ownership for nonpayment of taxes. Nearly all of this is commercial forest land which grows redwood and Douglas-fir timber. Because most of this is good timberland, it will undoubtedly return to private ownership under existing State and local policies of disposing of tax-deeded land. If allowed to remain in State ownership, this land could not be managed effectively for timber production because most of it is in relatively small scattered tracts. It could probably be managed best if consolidated with some of the adjoining larger private holdings.

Land in other State, county, and municipal ownerships amounts to about 3 percent of the total acreage of public land. About a fourth of this is timber-producing land. Most of it is in watershed holdings of municipal water organizations. Very little of this land is managed for timber production. Some of it is leased for livestock grazing.

Some timberland is in State holdings which are remnants of federal land grants to the State for the establishment and maintenance of schools. Some of this land has redwood and Douglas-fir timber on it, but it is in scattered inaccessible tracts.

Private Ownership

Private holdings have been classified into 9 ownership types and 11 size classes (tables 3 and 14). The ownership classification differentiates particularly between (a) corporations and individuals, (b) operating and nonoperating owners, (c) farmers and nonfarmers, and (d) recreational and other classes of owners. Although absolute figures are given to designate the number of land holdings and of owners in the various statistical tabulations in this report, these figures are estimates derived by line sampling procedure employed in this survey and described in detail elsewhere.13/ Area figures have also been derived by the same statistical procedure but rounded off to the nearest 1,000 acres. The area covered by this ownership survey is sufficiently large to permit a reasonably accurate estimate of the true situation from line sampling.

This analysis indicates that individuals and private agencies owned 5,089,000 acres of land in the study area in 1949. The privately owned commercial forest land included in these private holdings amounted to more than two thirds of the total commercial forest land area.

In comparison with the publicly owned land, the privately owned commercial forest land has much more redwood timber, but it has a smaller proportion remaining as old-growth saw timber (tables 8, 9, and figs. 8, 11).

Adoption of sustained-yield management by private owners of commercial forest land is complicated by variations in length of tenure and type and size of ownership. Private ownership is often short-lived and is diversified as to type and size rather than continuous and long-run and in large single ownerships. Successful management of forest land demands a continuity of tenure and management policy not found under some forms of private ownership. Furthermore, greatest immediate financial return to the owner rather than maximum production of quality wood often determines the owner's willingness to adopt long-range forestry practices. Some private corporations and individuals have overcome these difficulties and established successful continuous operations.

On ranch, farm, and recreation holdings, production of timber is not a major source of income. And, although timber-producing lands do not comprise the major part of some of these ownerships, the possibility of a forest enterprise should be considered in deciding upon the most economic use or the best combination of uses. Timber operations, under restricted harvesting practices, may well be possible on ranch, farm, and some recreation holdings without subsequent reduction in the value of the land for other uses.

13/ Hasel, A. A., and Adon Poli. A New Approach to Forest Ownership Surveys. Land Economics, 25(1): 1-10. February 1949.
Poli, Adon. Conducting a Survey of Ownership of Forest Land in California. Agricultural Economics Research. 4(1): 8 12. January 1952.

Table 3.- Percentage distribution of number of holdings, privately owned land, and privately owned commercial forest land by type of owner, Redwood--Douglas-fir Subregion, California 1949

Type of owner	Holdings			Total land area		Commercial forest land
	Number	Pct.	Av.size acres	Thousand acres	Pct.	Pct.
Timber operating company	116	0.6	6,595	765	15.9	25.4
Timber holding company	141	0.8	1,277	180	3.7	5.9
Timber operating individual	220	1.2	541	119	2.5	3.7
Timber holding individual	1,236	6.9	382	472	9.8	14.7
Range livestock farming company	17	0.1	5,941	101	2.1	1.9
Range livestock farming individual	1,121	6.3	1,471	1,649	34.3	27.0
Other farmers	6,393	35.6	120	767	15.9	7.6
Recreational property owners	2,983	16.6	98	291	6.0	5.3
Other classified owners	5,723	31.9	82	472	9.8	8.5
All classified owners	17,950	100.0	268	4,816	100.0	100.0
Unclassified	-	-	-	273	-	-
All owners	-	-	-	5,089	-	-

The unusually large number of small ownerships in this study area influences the nature of the forest management on these holdings. The chief uses for these small ownerships are recreation and residence. Timber production is unlikely to be a major use because the owners generally lack the capital investment and the knowledge required to establish a timber operation if it is set up. And they lack markets for the small quantities of forest products they could produce.

Owners with marketable timber on small holdings could perhaps work together and establish continuous timber operations through cooperative logging, milling, and marketing agreements. Or, these owners might harvest timber periodically by contracting for its removal and sale according to the best management practices. Some of the owners have little, if any, interest in timber production. They prefer to retain the timber for its aesthetic value.

Types of Owners and How They Use the Forest Land

Of the 17,950 classified owners of private land in this study area in 1949, 116 were timber operating companies engaged in commercial logging and milling of timber as a major enterprise (table 3 and figs. 12-14).[14/] These companies owned 16 percent of the privately owned land and 25 percent of the private commercial forest land. Most of the commercial forest land (91 percent) was in redwood timber. About half was old-growth saw timber. These holdings were medium and large, averaging 6,595 acres. Nearly all of them were obtained by purchase (table 21).

All but 6 percent of this land was operated[15/] by the owners. A small acreage was operated partly by owners and partly by others. None of these land holdings was leased completely to other operators (table 20).

About 89 percent of these holdings were used[16/] exclusively for timber operations (tables 4 and 12). The others were used primarily for timber operations in combination with other minor uses, principally farming and recreation.

The land in these corporate holdings is used mainly for logging and milling operations of various kinds and sizes. The largest sawmills are in the redwood timber zone near the coast. Heaviest production of lumber comes from several large sawmills that were established here many years ago after steam became the popular source of power in the lumber industry. These large-scale timber enterprises are centered principally

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14/ For other detailed classifications of type of ownership, refer to tables 7 to 11 in the appendix.

15/ The term "operated" as used here refers to the conditions of tenure under which the land is managed and used. In this case "operated by the owners" means that this land was managed by the legal owners of the land and not by others through leases or other contractual arrangements.

16/ The term "use" as applied in this section refers to the enterprise or combination of enterprises from which the owner derives the greater part of his income or satisfaction from the ownership of land.

Table 4.- Private land holdings by major land use and by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	All uses	Major land use: Timber operations	Farming and ranching	Recreation	Residence	Other uses & combinations of 2 or more uses	No use
	Number of holdings						
Timber operating company	116	103	-	-	-	9	4
Timber holding company	141	8	8	-	-	4	121
Timber operating individual	220	181	1	-	-	35	3
Timber holding individual	1,228	64	27	-	18	8	1,111
Range livestock farming company	17	-	12	-	-	5	-
Range livestock farming individual	1,121	1	967	-	8	135	10
Other farmers	6,393	6	6,049	6	23	256	53
Recreational property owners	2,963	5	-	1,842	29	312	775
Other classified owners	5,699	7	633	-	2,939	504	1,616
All classified owners	17,898	375	7,697	1,848	3,017	1,268	3,693
Unclassified	52	-	-	-	-	-	-
All owners	17,950	-	-	-	-	-	-

in Humboldt and Mendocino Counties, the highest lumber-producing counties in the State.17/

The logging of redwood trees requires heavy, high-powered equipment. This heavy machinery is costly and considerable capital investment is needed to buy it. Corporations like those included here had the necessary capital with which to finance the ownership of large timber holdings and the costly equipment needed to handle the large logs.

During the war and postwar periods, timber-processing corporations from other States have acquired timber holdings here to obtain a new source of raw material with which to continue or expand their lumber business. A fairly recent development is the establishment of plywood and fibreboard plants in certain parts of this area. The plywood plants utilize mainly Douglas-fir and small quantities of redwood and other species. A large hardboard plant recently built utilizes low grade logs and sawmill residues of redwood and Douglas-fir.

During the more than 100 years of timber operations in the subregion, a number of redwood sawmills have been closed down and dismantled for want of timber. Even in earlier years, operators of some of the large timber holdings cut their timber at a rapid rate. With the advent of steam-powered logging machinery, they removed timber from the forests in the most expedient manner with little regard for either the remaining timber stands or the condition in which they left the land. The remaining timber stands could thus no longer support a profitable operation.

In recent years, operators of large timber holdings have become more progressive in managing their land. They now realize that to stay in business they must give attention to the way they manage their timberland. This has resulted in improved logging methods, better fire protection, and establishment of the "tree farm" movement in which considerable effort is made to restock cut-over land and to maintain sustained-yield operation.

About 141 owners were timber holding companies which kept timber principally for future commercial timber operations. These were investment companies, nonresident lumber manufacturers, former active lumber companies that have stopped operations because they have run out of old-growth saw-timber, and other private organizations holding timber either for their own use or to sell to others. These companies held 4 percent of the total privately owned land area and 6 percent of the private acreage of commercial forest land. About 95 percent of their land was commercial forest land. Almost four-fifths of the commercial forest land was in redwood timber. More than half was old-growth saw timber. Their holdings were of medium size, averaging 1,277 acres.

17/ May, Richard H. Lumber Production in California and Nevada, 1951. Forest Survey Release No. 17: 1-14. Calif. Forest and Range Expt. Sta., Berkeley. December 1952.

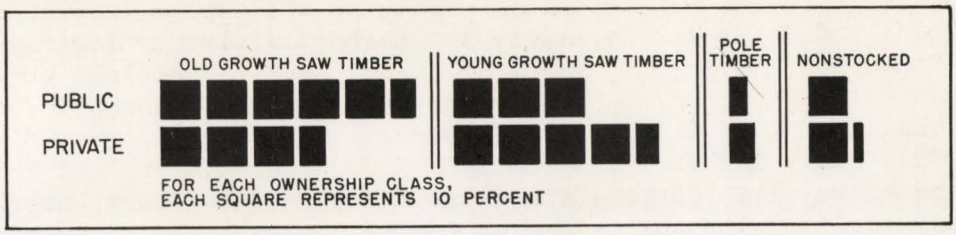

Figure 11.- Percentage of timberland acreage in public and private ownership by stand-size class.

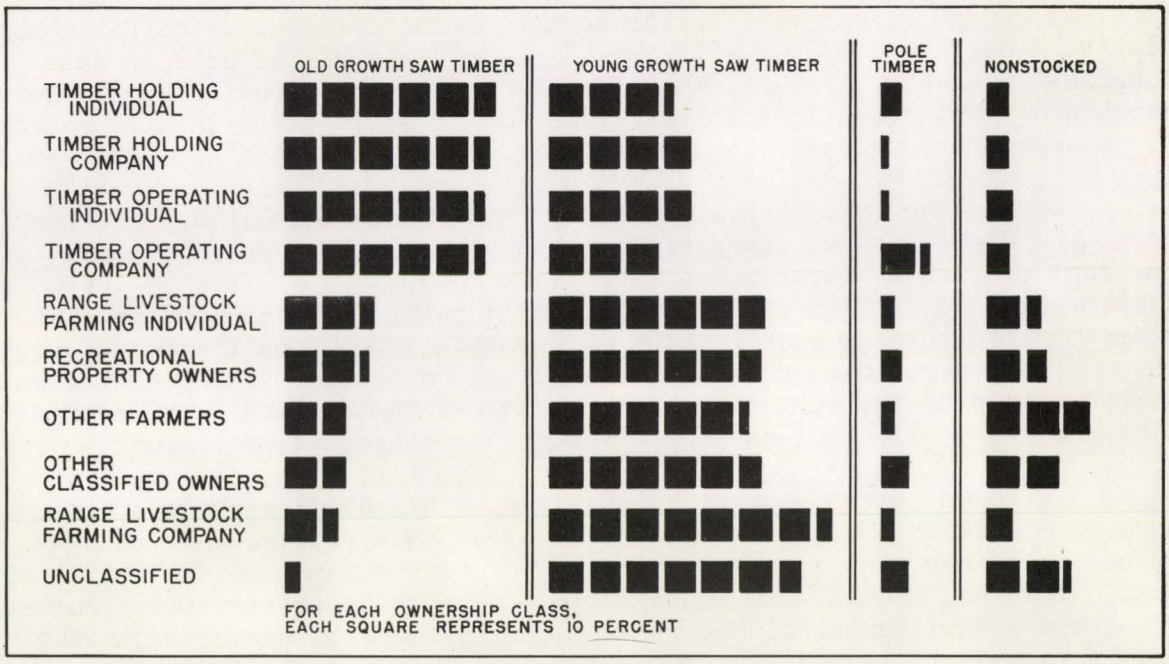

Figure 12.- Percentage of timberland acreage in each type of private ownership by stand-size class.

About 83 percent of the land was purchased, 6 percent was inherited by officials and stockholders of the companies, 2 percent was obtained by foreclosure, and the rest was acquired in other ways and by combinations of 2 or more methods of acquisition.

Most of the commercial forest land of these holding companies is rather well-stocked with old-growth and young-growth saw timber. This land is held and managed principally for timber production, but some land is also leased to nearby ranchers for livestock grazing. In 1949, land in approximately 6 percent of the holdings was used for grazing. During this same year, local loggers and lumbermen negotiated contracts with the owners to harvest timber from the commercial forest land in their holdings. About 6 percent of these ownerships, which included about 12 percent of the land,

were operated in this way. About 2 percent of the ownerships with about 20 percent of the land were operated partly by the owners, principally for recreation and residence, and partly by others, mainly for logging and grazing. These are generally large holdings used for multiple purposes such as timber operations, grazing, recreation, and residence in various combinations.

The bulk of the land holdings in this ownership class, however, are reserved for future use, that is, the timber is not now being cut. Ordinarily, they remain in growing timber until the time arrives to start cutting the timber for the owners' own operations, to sell the timber to other operators, or to sell the timber and the land. In 1949, 86 percent of these holdings, comprising 66 percent of the land, were kept in growing timber for future use.

A number of these timber holding companies have had land in this area for many years. Some of them once had sawmills in operation on their holdings. Others have lumber businesses outside the State and have acquired timberland here to obtain raw material for future use. But some are strictly land-holding companies which manage their land for timber production but do not conduct their own operations. This land is operated by others who contract with the owners to cut the timber, or lease grazing land.

Some 220 owners were timber operating individuals engaged in timber operations of various kinds as a major business. These were persons logging timber, operating large and small sawmills, or splitting timber commercially for sale. These individuals owned 3 percent of the privately owned land and 4 percent of the privately owned commercial forest land. About 89 percent of their land was commercial forest land. Almost two-thirds of this was in the redwood timber zone. A little more than half was old-growth saw timber. These holdings averaged 541 acres in size.

About 91 percent of this land was purchased, 3 percent was inherited, and the rest was obtained in other ways and by combinations of various methods of acquisition.

This land was used principally by the owners in their own timber operations. About 82 percent of the land holdings supplied wood for the manufacture of timber products of various kinds. The other land holdings were used primarily for timber operations in combination with other minor uses--mainly farming, recreation, and residence.

During and after World War II the increased demand for lumber stimulated the establishment of small-scale timber enterprises. Small sawmills, operated mainly by individuals, are scattered throughout the forest area. They are generally found in small community centers, on farms, and in other favorable locations where timber, markets, labor, transportation facilities, and housing are available. The mill owners use timber from their own land for part of their log supply, but they also buy stumpage from other owners. Sometimes they buy logs from logging contractors, who usually deliver to the mill.

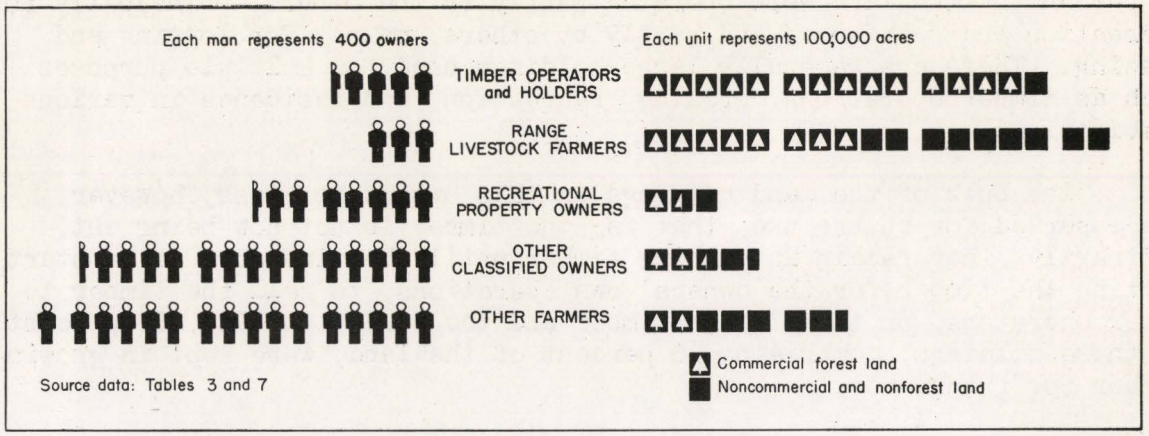

Figure 13.- Number of private owners and acreage owned, by type of owner.

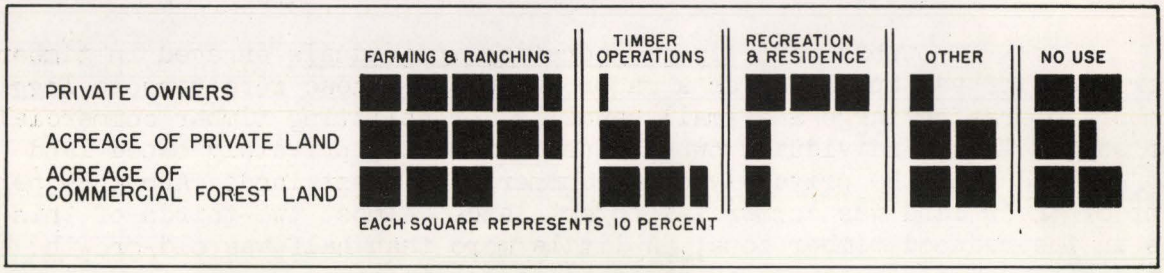

Figure 14.- Percentage distribution of owners and of acreage of private land, by land use.

About 1,236 owners were timber holding individuals who kept timber principally for future timber operations either for themselves or to sell to others. This group was made up of businessmen, tradesmen, mechanics, retired persons, professional people, housewives, white-collar workers, laborers, and others. These timber holders owned 10 percent of the private land, with 15 percent of the private commercial forest land. Three-fifths of their commercial acreage of forest land was in the redwood type. Almost three-fifths was old-growth saw timber. Their holdings were generally small, averaging 382 acres.

These individuals acquired 79 percent of their land by purchase, 15 percent by inheritance and gift, and the rest by other methods and by combinations of 2 or more methods.

About 6 percent of the owners operated their own land, 4 percent leased their land, and 90 percent left their holdings idle, that is, without any form of planned management.

In this, as in most forest regions, many small scattered timber holdings are not used by the owners. People acquire these holdings under many circumstances, but they fail to do anything with the land after they get it. Consequently, some pay taxes for many years until they finally dispose of their holdings by sale or trade, or pass them on to their heirs. A number of these properties are speculative purchases of land at tax sales. Some are the result of land exchanges; others are gifts from relatives. Most of the idle holdings are in remote areas without roads or other suitable means of access to them. Many belong to nonresidents who have never seen their land.

A large share of the individual owners know little about management and use of forest land. Some owners believe that forests require no care. Others lack sufficient interest to do anything constructive about forest management. The indifference of most of these owners prevents proper management and use of the timber on a rather sizable acreage of timber land.

This situation can be improved through consolidation of some of the smaller timber holdings of this type of owner in such a way as to simplify the present ownership pattern. Future sale or voluntary exchange of some of these properties should be encouraged whenever it involves consolidation with larger and better managed timber holdings. Management of some of these small timber holdings by consulting or public service foresters offers possibilities.

There were 17 range livestock farming companies engaged in range livestock ranching operations as a major business. These farming companies collectively owned only about 2 percent of the privately owned land and 2 percent of the private commercial forest land. A little more than half of their land consisted of commercial forest land. Half of this was classified in the redwood type and the other half in the Douglas-fir type. Their holdings were medium and large, averaging 5,941 acres.

About 92 percent of the land in these corporate holdings was purchased. The rest was partly purchased and partly inherited by stockholders and officials of the companies.

About 71 percent of these holdings were used almost exclusively for grazing of livestock. The rest were used principally for grazing livestock in combination with other secondary uses, mainly timber operations and recreation.

Most of the corporate ownerships are large-scale ranching enterprises operated by hired resident managers. These managers are generally well qualified for their jobs and know how to manage these large holdings properly, particularly for grazing. If there is sufficient acreage of good timberland in their ranch holdings, they may manage it for timber production, but usually as a secondary enterprise.

There were 1121 range livestock farming individuals whose major enterprise was range livestock farming. These ranchers owned the largest shares (34 and 27 percent respectively) of the private land and of the private commercial forest land. The redwood type occupied about one-third of the commercial forest land. The rest was mostly in Douglas-fir. Slightly less than a fourth of the commercial forest land was in old-growth saw timber. The land holdings were mostly of medium size, averaging 1,471 acres.

These owners acquired 72 percent of their land by purchase, 16 percent by inheritance and gift, 1 percent by homestead, 1 percent by foreclosure, and the rest by other methods and combinations of various methods, mainly purchase, inheritance, and homestead.

About 84 percent of the land in this class of ownership was operated by the owners, 8 percent was leased to other operators, 7 percent was partly operated by owners and partly leased to others, and only about 1 percent remained idle. Some 86 percent of the land holdings were used for grazing livestock. The rest of the land holdings were used principally for combinations of 2 or more uses, mainly ranching with timber operations or recreation as secondary uses.

These livestock ranchers are located primarily on the grass and woodland-grass lands that lie in the Douglas-fir timber type east of the redwood timber belt, and the grassland benches and slopes west of the redwood timber near the ocean. Cattle and sheep are the main types of livestock grazed. Although quite a large part of the commercial forest land acreage is in these ranch holdings, most of it was not acquired originally to grow timber. It was obtained as part of the ranch units along with larger acreages of grass and woodland-grass with which the timberland was intermingled. Some was obtained also from former timber operators as cut-over land after the old-growth timber was removed. The cut-over land was used by the ranchers for grazing livestock until brush and young timber grew back and displaced the grass. Because the major interest of these ranch owners is in grazing livestock, a comparatively large acreage of commercial forest land in their ranch holdings gets little or no management for timber production. Repeated burning has left a large share of the commercial forest land in these ranch holdings stocked with brush instead of timber. As a consequence, this land contributes little or nothing to the income of the owner.

Attempts to convert timber-producing land to grassland have met with varying degrees of success. One explanation for this is found in a recent study of soil-vegetation relationships in the redwood region.18/ This study rated some timberland soils as of little or no value for producing grass (figs. 15, 16). This work has emphasized the importance of knowledge about soils in deciding the best use for certain forest lands.

18/ Storie, R. Earl and A. E. Wieslander. Dominant Soils of the Redwood--Douglas-fir Region of California. Soil Science Proceedings 16(2): 163-167. April 1952.

Figure 15.- An apparently successful conversion of timberland on a ranch holding to range by burning. Dead tree snags are mostly Douglas-fir.

Figure 16.- An apparently questionable clearing operation on a ranch holding by burning. Low brush species seem to be taking over the cleared land formerly in timber. Success of operations of this type is highly dependent on kind and quality of soil, slope exposure, and the climate.

Increased value of Douglas-fir in recent years has aroused interest in timber production, and discouraged conversion of timberlands to grazing lands. Because livestock ranchers own such a large share of the commercial forest land, consideration might be given to various ways of stimulating their interest in producing more timber. Educational programs to point out the economic benefits that can be derived from multiple-use management of timberland should be sponsored, particularly by agencies dealing with farm programs. Farm-forestry programs should be expanded so as to provide adequate guidance and assistance to ranchers and farmers in integrating the timber enterprises with the ranching activities. Sometimes, consolidation of the timberland in the ranch holdings with adjoining timber holdings could provide for more efficient operations. A good start in this direction has been made by the people of Humboldt County where considerable effort is currently being devoted to the formulation of a long-range forestry program for various kinds of forest land holdings.

Other farmers, engaged in types of farming other than range livestock ranching as a major enterprise, numbered 6,393. This group was the largest in number of all the ownership classes. It controlled 16 percent of the privately owned land. These holdings had 8 percent of the privately owned commercial forest land, about half of which was in the redwood timber zone. Only 16 percent of the commercial forest land was old-growth saw timber. Holdings were small, averaging 120 acres.

These farm owners bought 72 percent of their land, obtained 20 percent by inheritance and gift, 1 percent by homestead, and the rest by other methods and various combinations of methods, mainly purchase, inheritance, and homestead.

Owners operated 81 percent of their own land, 15 percent was leased to other operators, 3 percent was in holdings operated partly by owners and partly leased, and about 1 percent remained idle.

Ninety-five percent of these holdings were used for farming, and the remaining 5 percent were used primarily for farming in combination with other minor uses, principally recreation and timber operations.

Throughout the study area are many small acreages operated as general farms, dairies, orchards, vineyards, poultry farms, and part-time farms. Dairies are mostly near the coast and along the western fringe of the redwood timber zone throughout almost its entire length. Orchards and vineyards are principally in the large interior valleys, but some are also in the smaller valleys and natural openings in the timber (fig. 6). Some of these farms were developed on cut-over land where the soil and other natural attributes favored agricultural use (figs. 17, 18). Poultry farms are scattered throughout the area, but most are concentrated in Sonoma County. Part-time farms are located primarily near community centers. The owners work on the farms during the winter and other seasonal periods of unemployment, and in the nearby sawmills, logging camps, and other local industries in summer and at other times when labor is in demand.

Figure 17.- This scene shows two small adjoining general farms typical of many found in natural openings and on cut-over land in various parts of the redwood forest. Such farms were originally developed by "old timers" who settled here in the late 1800's. Some are now held by urban people as hunting lodges and rural residences. Others are still operated as farms.

Figure 18.- Former redwood timberland on a farm holding converted to agricultural use by cutting and burning. The land is now used as a vineyard. Size and number of the stumps in this scene indicate that the land once supported a heavy stand of timber. Because redwood stumps are large they are difficult to remove completely from the land.

But even though more than a fourth of their land consists of commercial forest land, these small-scale farmers rarely manage it for timber production. Consequently, their timberland (about 8 percent of the total acreage of private commercial forest land) contributes little to the forest production of the region. Improved programs of farm-forestry through public or private initiative would help this situation materially. The need for these programs is recognized in the following excerpt from the Report to the Legislature by the California Forestry Study Committee:

> "There are two important factors needed to bring about better care and more complete use of the farm forests of California. The first of these is a good prospect of future as well as present financial gain for the owner of such lands and the second factor is a means of getting information to the owner on such matters as what and where the markets are and how the products should be measured, prepared and sold ....To advise the rancher of the possibilities of his forest land and to assist him in determining how the land might be best managed there is need for 'high grade educational work by extension men. As soon as possible the State Forester should be given authority and the means to carry on this kind of work.'"19/

In the study area, two large groups of owners had land holdings somewhat similar in terms of type of land, size, and use. The first group consisted of 2,983 recreational property owners who held land mainly for recreational use. This group included owners of resorts, dude ranches, summer cottages, and owners of land acquired for hunting, camping, and other forms of outdoor recreation. About two-thirds of the land holdings were used by the owners; about a fourth were left idle, and only a few were leased. Most of the land holdings were used for recreation, or for recreation in combination with other uses, mainly farming and timber operations. The idle holdings were reserved for future recreational use.

The second large group of owners were the 5,723 other classified owners. These owners could not logically be placed in any of the ownership groups previously described. In this class were owners of land held for residential or business purposes only, mining claims, watersheds, and reservoir sites, and miscellaneous owners who held land for various other reasons. Three-fifths of these holdings were used by the owners, chiefly for residence; about 10 percent were leased to others, principally for farming and ranching; and almost 30 percent were left idle.

More than four-fifths of the land holdings of these two ownership groups were acquired by purchase; about a tenth, by inheritance and gift; and the rest, by various other methods such as foreclosure, exchange, and combinations of various methods. Included in these two ownership classes were 16 percent of the privately owned land and 14 percent of the private commercial forest land. A little more than half of their commercial forest land was in the redwood type, but only about a fifth was stocked with

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19/ The Forest Situation in California. Report to the Legislature by California Forestry Study Committee. Created by Senate Resolution No. 151, Statutes of 1945. Vol. II, p. 18, 1947.

old-growth stands. These holdings were generally small, averaging 98 acres for recreational ownerships and 82 acres for other classified owners.

As indicated by these two relatively large groups of owners, recreation and residence are popular uses of rural land. Almost 5,000 private ownerships--more than a fourth of the total number--were used for these two purposes. About another 800 were acquired for these purposes but had not yet been put to the intended use by the owners.

The mild pleasant climate of this area; its accessibility to a large urban population; the scenic beauty of the forests, the beaches, and the rugged shoreline; and the splendid opportunities for fishing, hunting, swimming, camping, and other popular forms of outdoor recreation have attracted many part-time and permanent residents. The relatively low cost of land, taxes, and other overhead items in certain counties has been another inducement. This demand for land for recreational and residential use has influenced considerably the pattern of ownership in this area.

Recreational and residential holdings are particularly numerous in Santa Clara, Santa Cruz, San Mateo, Marin, Sonoma, and Mendocino Counties. These counties are near the San Francisco Bay region where a heavy concentration of population exerts considerable pressure on the land use pattern of the nearby rural land resources. Access to public forest land is also more limited here than elsewhere in the State. As a result, private timber and farm land is constantly being removed from commercial production and placed into recreational and residential use. These holdings are relatively small compared to those of other types of private owners, and often only a small part of each holding is actually used for residence or recreation. The unused portions are withdrawn from timber production or farm use because of the believed incompatibility between recreation and these uses. The result is a reduction in the area of timber-producing lands.

Commercial recreation in some of these counties has become a major industry. Elaborate resorts, dude ranches, motor courts, and many other commercial enterprises cater to a steady flow of weekend guests, vacationists, sportsmen, and out-of-State tourists that is particularly heavy in late spring, summer, and early fall. Recreational use of forest land is justified here to satisfy the needs of a large urban population and out-of-State tourists. Besides, the forest land in this region is unusually attractive and suited to this type of use. But recreational and residential development should be adequately planned so as not to create undesirable patterns of ownership and use. Scattered settlement should be avoided because it increases the fire hazard and makes protection difficult and costly. Furthermore, indiscriminate placement of tourist courts, cabin sites, and roadside commercial enterprises often destroy the scenic values of otherwise picturesque forest areas. Establishment of local planning groups to plan, organize and direct such settlement, and to develop additional public recreational areas, where necessary, seems desirable. Zoning ordinances to restrict recreational and residential development and other land uses within certain designated areas should also be considered.

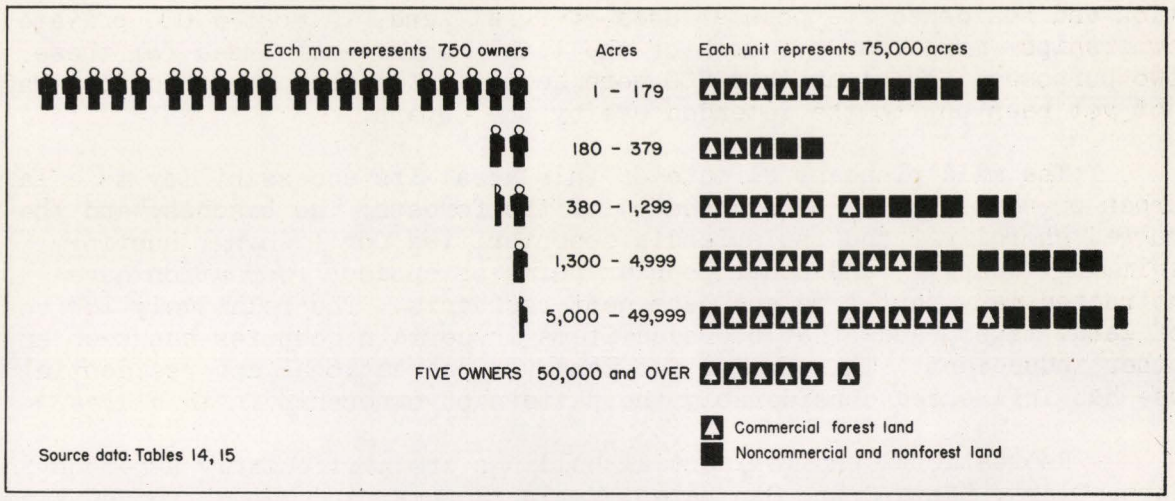

Figure 19.- Number of private owners and acreage owned by size of holding.

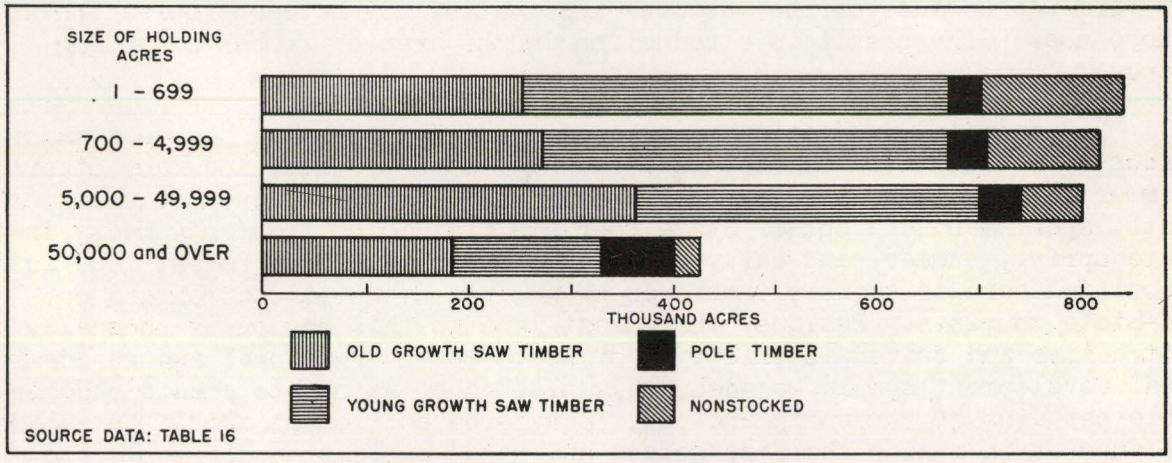

Figure 20.- Commercial forest land by stand-size class and by size of holding.

Size of the Forest Land Holdings

Private ownerships were grouped into 11 size classes, ranging from holdings of less than 180 acres to those of 50,000 acres or larger (table 14).20/ In this subregion, an unusually large number of ownerships are in the small size classes. Eighty-four percent of the total number of ownerships are smaller than 180 acres; this is 11 percent more than in the adjacent Coast Range Pine subregion. Less than 1 percent are of 5,000 acres or larger (figs. 19, 20).

The smallest ownerships are found in Santa Cruz and Santa Clara Counties where recreation and residence are important uses of forest land. The largest holdings are in Humboldt and Mendocino Counties where large-scale timber operations and ranching prevail.

The unusually large number of small ownerships found in the study area is due principally to the recreation and residential use of small tracts of timberland. Also, the pattern of small ownerships fostered by early Federal laws has remained in certain parts of the study area where subsequent conditions favored small holdings.

It is difficult to arrive at definite conclusions as to the desirability or undesirability of an ownership pattern preponderantly of small holdings, particularly where the use pattern is as complex as it is here. Most foresters contend that a complicated pattern of small individual ownerships is not conducive to good forest management.21/ This, of course, applies to forest land on which commercial timber production is presumably the best use economically.

In commercial forest land areas, the presence of small holdings used for a number of different purposes generally increases the fire hazard and makes protection more difficult. Satisfactory programs of forest land management are harder to develop and to administer because of the many and varying interests of the owners. If timber production is the major objective of management, small individual holdings generally lack sufficient growing stock to provide for efficient operation. The handling of logs from large trees, particularly redwoods, requires large capital investments in heavy machinery beyond the financial capability of most owners of small tracts. Suitable markets for timber from small holdings are also generally inadequate. These and other related factors usually discourage good forest management by owners of small holdings.

20/ For other detailed classifications of size of ownership refer to tables 13, and 15 to 19 in the Appendix.

21/ The Forest Situation in California. op. cit., p. 17.

Folweiler, A. D. and H. J. Vaux. Private Forest Land Ownership and Management in the Loblolly-Shortleaf Type of Louisiana. Jour. Forestry 42 (11): 786. Nov. 1944.

U. S. Department of Agriculture. Forest Service. The Management Status of Forest Lands in the United States. Report 3 from a Reappraisal of the Forest Situation. pp. 6, 7. Washington, D. C., 1946.

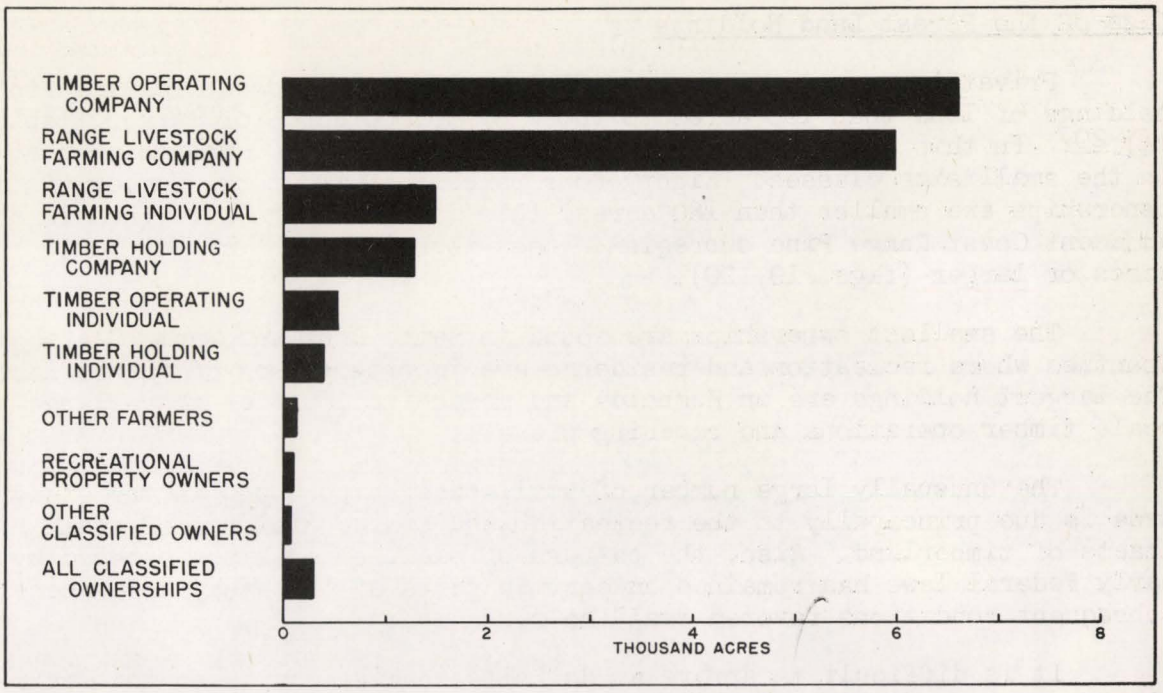

Figure 21.- Average size of holdings of private owners.

But where recreation has been established as the major use of a forest land area, as has been done in counties near the San Francisco Bay area, a pattern consisting of many small holdings is well suited to that particular use. If the recreational areas are properly blocked out and their development adequately planned, small forest land holdings are suitable units for recreational settlements. The main objective on recreational holdings is not producing timber but keeping and protecting the trees for their aesthetic values.

An important task in this study area is to consolidate some of the scattered small timber holdings in commercial timber areas that are not suitable for recreational or residential use. This is desirable so as to simplify the ownership pattern for efficient management of timberland.

Relationship Between Size and Type of Ownership

The largest private land holdings in this forest region are those of timber operating companies (table 19 and fig. 21). These large ownerships are concentrated in Humboldt and Mendocino Counties. Most of this land was bought many years ago and consolidated into a few rather well-blocked forest land holdings. About three-fifths of the land in this ownership class is in units of 50,000 acres and larger. These large holdings are held almost exclusively for commercial production of timber and timber products. Some of them offer excellent opportunities for the practice of sustained-yield forest management, and several of the operators are developing plans for long-range operations.

The second largest holdings are those of range livestock farming companies. None of these exceed 50,000 acres in size. A little more than half of the land in this ownership class is commercial forest land. Land in this ownership class is held principally for livestock range. Fairly large acreages of range land are required for efficient ranch operations.

The next largest holdings are those of range livestock farming individuals and timber holding companies. Most of the land of range livestock ranchers is in the medium size classes--a size generally suitable for efficient management of the type of livestock ranches found here. Although land of timber holding companies is mainly in units of medium size, some land is also in a few large holdings of 30,000 acres or more.

The smallest land ownerships are those of other classified owners, recreational owners, and nonlivestock farmers. Land of other classified owners is used principally for residence and other similar uses that require only small tracts of land. Recreational use of holdings generally demands little more than a camping area or summer home site, except for enterprises like dude ranches and resorts. Nonlivestock farmers have mostly small holdings because the intensive type of farming practiced can be done on relatively small tracts of land. Quite often only a small part of the entire ownership is cultivated. Timber cut from commercial forest land on these holdings is used primarily on the farm.

Operating Tenure

Private ownerships and privately owned land were classified into 4 types of operating tenure (table 20 and fig. 22). A classification of tenure by type of ownership shows that 70 percent of the private owners operated their own land; 7 percent leased their land to other persons; 2 percent operated part of their own land and leased part to others; and 21 percent left their land idle.22/

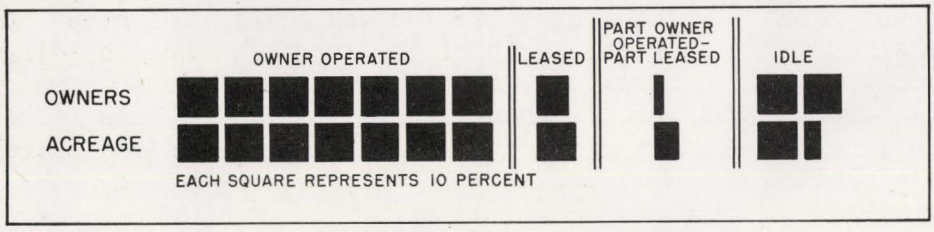

Figure 22.- Percentage distribution of owners and of acreage of private land, by tenure.

22/ The term "idle" as used here means that at the time of survey the land was not intentionally managed for any specific purpose other than to let the timber and other vegetation grow, more or less in its natural state.

Timber operators used most of their land (94 percent) for their own business operations. They leased very little of their land to others and left very little of it idle. Timber operators own land principally to produce timber for sawmills and other processing plants which they operate themselves. Their land holdings constitute a significant part of their business enterprise upon which their plant operations depend. Hence, very little of their land is left unused or is used for purposes other than producing timber for their operations. A small acreage of land is leased occasionally to nearby ranchers for grazing livestock.

Farmers and ranchers operated more than four-fifths of their land in their own ranch and farm enterprises. A limited acreage was leased to other ranch operators, but very little of their land remained idle. Farmers and ranchers use their land holdings principally for their own farming and ranching enterprises. In other words, they are mainly operators, not landlords. The types of farming and ranching enterprises carried on here require close supervision by the operators. This is not conducive to tenant operation or to letting the land holdings stand idle.

Owners of recreational land holdings operated slightly less than two-thirds of their land themselves. They leased a small acreage to others, but they left a fourth of their land idle. The relatively large share of idle land probably belongs to persons who plan to develop their holdings at some future time. Some are holdings of owners who plan to retire in a few years and then spend all or part of their leisure time developing their land. Some of these holdings belong to nonresident owners who have acquired the land "sight unseen" and have yet to put it to the intended use. Because recreational holdings are small, unimproved, and include much forest land, they are not usually leased by ranchers or by others.

Timber holding individuals and timber holding companies operated a relatively small proportion (less than 18 percent) of their own land. More than two-thirds of this acreage was left in growing timber for use sometime in the future. Because these holdings consist largely of commercial forest land, they have only limited value for uses other than timber operations. Furthermore, much of the land of timber holding individuals is in small, undeveloped, isolated units. Even if some of this land is suitable for grazing, ranchers are reluctant to lease it because of the difficulty of managing a group of small, unfenced, and scattered holdings as an efficient economic unit.

Considerable land of timber holding individuals is held for resale at a profit. Owners of such land are not particularly interested in the long-term use of the land. Some of this land is owned by nonresidents whose major interests are in other business enterprises. These owners usually have neither the time nor the inclination to concern themselves with the management of their land.

A classification of tenure by size of ownership shows that leased land was principally in units smaller than 20,000 acres. There was no idle land in holdings of 20,000 acres and larger, but considerable idle

land was concentrated in ownership units smaller than 180 acres. In contrast with conditions found in the Coast Range Pine subregion, where most of the land leased was in the large size classes, most of the leased land here is in medium-sized and small units. This is probably due to the fact that range land, the land most commonly leased, is in smaller units here than it is in the Coast Range Pine. The large holdings in the Redwood--Douglas-fir subregion consist almost entirely of commercial forest land with little range land to lease to ranchers. Nearly all of these large timber holdings are operated by owners almost exclusively for timber production.

How the Owners Acquired Their Land

The way in which land is obtained often influences the way it is used and managed. Purchasers of land generally have more positive plans for its use and management than do persons who obtain land by involuntary means such as foreclosure or gift. The buying of land usually requires a certain amount of effort and financial sacrifice. To a buyer with limited means, the buying of a piece of property may represent the most significant business transaction of his career. Usually land becomes a part of a major business enterprise--a lumbering concern, a farm, or a resort. To succeed in his particular business, the buyer must give considerable thought to the location, type, quality, and size of his land holding. Because of these considerations, the person who invests his own money in land is likely to give it greater attention than one who obtains property in some easier way. Exceptions to this generality are purchases of relatively inexpensive land by speculators. As these buyers obtain land only for resale at a profit, they often do not care how the land is managed during the short time they hold it. Speculative deals like these, however, seldom involve large acreages of land because individual holdings are usually small.

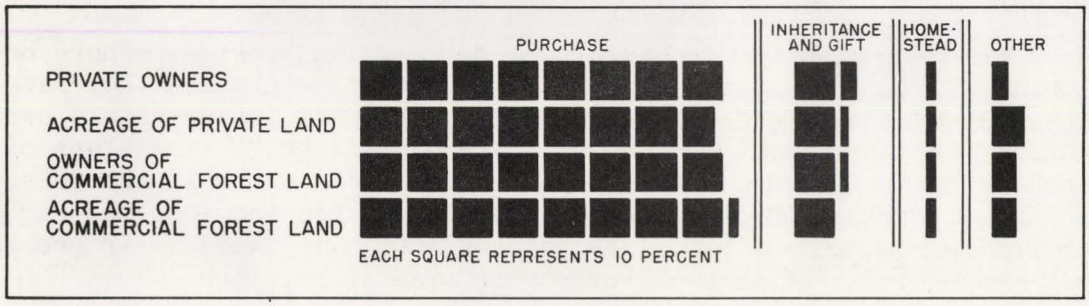

Figure 23.- Percentage distribution of owners and of acreage of private land, by method of acquisition.

In this study area, about four-fifths of the land holdings were acquired by purchase (tables 21, 22, 23, and fig. 23). The proportion of purchased land here is greater than that found in the adjacent Coast Range Pine subregion as well as in ownership studies of forest land elsewhere.23/ This may be due to the fact that much of the redwood timber land was obtained from the government by persons who sold it shortly afterward to timber operators and to land speculators. Or, the high proportion of purchases may reflect the great demand for redwood for commercial timber production and recreational use. Also, the many small holdings found in this forest area may be the result of subdivision and sale of land acquired by methods other than purchase. In other words, there may have been greater turnover of land from the original owners here than occurred in other forest regions. This fact is exemplified further by the low proportions of land holdings in the homestead, inheritance, and gift classifications when compared with similar figures from other forest areas. Relatively small proportions of the land remain with the original "homesteaders." Speculative purchases and sales of properties may have reduced the tendency to pass land to heirs of the original owners. Acquisition by other methods represented only a small percentage of the total.

Where the Land Owners Are

The distance an owner lives from his land influences, to some extent, the degree and quality of management he provides his property. A recent study in Central Mississippi found "that owners who live at distances above 50 miles from their forests have generally poorer management than owners who live closer to their properties."24/ In the present study it was not possible to compute distances for the owners sampled, but it was possible to obtain from the tax rolls the mailing addresses of the owners. These addresses were used as a basis for a generalized classification by residence of owner (table 5 and fig. 24).

This classification shows that about two-thirds of the owners reside or have business headquarters in the same county in which they have their land (tables 5, 24, and fig. 24). Included in these holdings is 63 percent of the privately owned land and 57 percent of the private commercial forest land.

About 29 percent of the owners of private land reside or have business headquarters within the State but outside the county in which they have their land. Included in these holdings is about a third of the privately owned land and of the commercial forest land. Land holdings of this class of owner are smaller on the average than holdings of similar owners in the Coast Range Pine subregion. Greater use of land in the Redwood--Douglas-fir subregion for recreation and part-time residence by city dwellers is probably largely responsible for this difference in size of holdings.

23/ Barraclough, Solon and Jas. C. Rettie. The Ownership of Small Private Forest-land Holdings in 23 New England Towns. Northeastern Forest Experiment Station Paper No. 34. p. 7. Upper Darby, Pa. March 1950.

24/ James, Lee M., W. P. Hoffman, and M. A. Payne. Private Forest Landownership and Management in Central Mississippi. Miss. Agr. Expt. Sta. Tech. Bul. 33, p. 27. State College. April 1951.

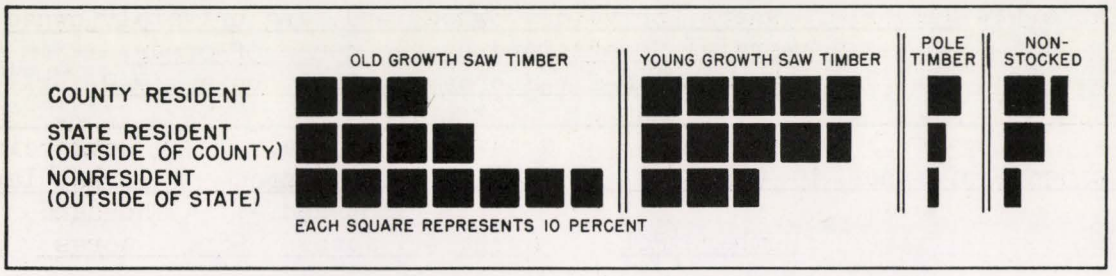

Figure 24.- Percentage distribution of acreage of timberland of resident and nonresident owners, by stand-size-class.

About 3 percent of the owners reside or have business headquarters outside the State of California. Included in these holdings are 6 percent of the privately owned land and 9 percent of the private commercial forest land.

Land of resident owners has the lowest percentage of old-growth saw-timber acreage and the highest percentage of nonstocked acreage. This is probably due to the fact that resident owners, particularly farmers and ranchers, use their land more intensively than do nonresident owners. Also, more of their old-growth timber has been cut, and the cut-over land put to nonforest uses.

Out-of-State nonresident owners, here as in the Coast Range Pine subregion, have the highest percentage of their acreage remaining as old-growth saw timber and the lowest proportion of nonstocked timberland. These out-of-State owners are keeping large holdings principally for future use. Because their land is not used intensively, much of their timber remains in its original state.

Occupation of Owners

Private owners were classified into 11 major occupational groups (tables 6 and 25). This classification reemphasizes the fact that a rather large share of the private commercial forest land is owned by persons with activities not directly related to production of timber and timber products. For example, ranchers and farmers combined own more commercial forest land than do persons now actively engaged in timber operations as a major business. Their share amounts to a third of the privately owned commercial forest land acreage. This fact stresses the need for effective farm-forestry programs to assist farmers and ranchers in managing the large acreage of timberland they control.

Considerably more commercial forest land here is controlled by timber operators than was found in the Coast Range Pine subregion. Timber operations started here sooner and were carried on on a larger scale than in the Coast Range Pine. More of the timberland in the Coast Range Pine subregion is owned by those holding it for future use.

Table 5.- Number of owners, privately owned land, and privately owned commercial forest land by residence of owner, Redwood--Douglas-fir Subregion, California, 1949

Residence of owner	Owners		Av. size of holding	Total land area		Commercial forest land	
	Number	Pct.	Acres	Thousand acres	Pct.	Thousand acres	Pct.
Resident--in the county	11,980	68.6	250	2,990	62.5	1,639	56.9
Nonresident--outside the county (but within the State)	5,018	28.7	301	1,508	31.6	993	34.5
Nonresident--outside the State	480	2.7	590	283	5.9	247	8.6
All classified owners	17,478	100.0	274	4,781	100.0	2,879	100.0
Unclassified owners	472	-	653	308	-	43	-
All owners	17,950	-	284	5,089	-	2,922	-

Operators of nontimber business enterprises hold a sizable share of the forest land. These are principally individuals and companies holding timberland for future use or for resale. They generally have fairly large holdings. Others are operators of small businesses who have acquired small tracts of timberland for various reasons.

The rest of the acreage of timberland is not heavily concentrated in any particular occupational group. It is significant, however, that forest land was owned by many different kinds of owners (table 6).

Reasons for Acquiring Land and Plans for Future Use

Farming and ranching, residence and recreation, timber operations, and speculation were principal reasons for acquiring land in the study area. More than two-fifths of the total number of owners obtained land for farming and ranching; about a third acquired land for recreation and residence; and the remainder obtained land for resale at a profit, for timber operations, and for other miscellaneous uses and various combinations of two or more uses (tables 26, 27, and fig. 25).

Table 6.- Number of owners, acreage of privately owned land, and privately owned commercial forest land by occupation of owner, Redwood--Douglas-fir Subregion, California, 1949

Occupation	Privately owned land				Privately owned commercial forest land			
	Owners		Land area		Owners		Land area	
	Number	Pct.	1,000 acres	Pct.	Number	Pct.	1,000 acres	Pct.
Range livestock farmer	984	7.1	1,486	33.2	762	10.5	731	27.1
Other farmer	4,880	35.2	576	12.9	1,822	25.1	179	6.7
Timber operator	336	2.4	884	19.7	279	3.8	841	31.2
Operator of other business	1,929	13.9	712	15.9	1,134	15.6	476	17.7
Professional	790	5.7	135	3.0	501	6.9	63	2.3
White-collar worker	372	2.7	34	0.7	244	3.4	23	0.9
Skilled wage earner	1,071	7.7	59	1.3	628	8.6	39	1.4
Unskilled wage earner	207	1.5	16	0.4	117	1.6	9	0.3
Housewife	630	4.6	64	1.4	345	4.7	39	1.4
Retired	1,580	11.4	230	5.1	849	11.7	115	4.3
Other	1,086	7.8	286	6.4	588	8.1	179	6.7
All classified owners	13,865	100.0	4,482	100.0	7,269	100.0	2,694	100.0
Unclassified	4,085	-	607	-	2,548	-	228	-
All owners	17,950	-	5,089	-	9,817	-	2,922	-

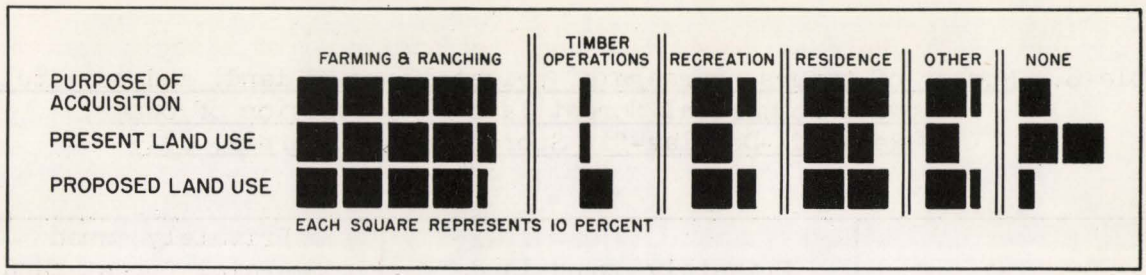

Figure 25.- Percentage distribution of owners of land by purpose of acquisition, and present and proposed land use.

A few more owners now use their land for timber operations than originally acquired land for that purpose. And there are many more who plan to cut timber on their holdings at some future time. The present brisk demand for redwood and Douglas-fir timber is stimulating operations on some of the small private timber tracts originally acquired for other reasons, principally speculation, residence, multiple use, and farming (table 28). Of 1349 owners of land who plan timber operations as a future use, 292 actually acquired their land for that purpose, and only 280 are now using their land for timber operations.

An analysis was made to determine how many owners actually use, or still intend to use, their land for the purpose for which they originally acquired it. Eighty-three percent of the owners who acquired land for single-use purposes actually followed through with their plans and placed their land in the intended use (table 30). Another 5 percent who have not yet placed their land into the use planned expect to do so at some future time. This means all but 12 percent of the owners will eventually adopt their original plans for utilization.

Relatively few (less than 10 percent) of those who acquired land for farming and ranching failed to use it for agriculture, but a small number (about 1 percent) plan to shift from farming and ranching to some other use in the future. Slightly more than two-thirds of those who acquired land for timber operations and for recreation now actually use their holdings for these purposes, and there are about 16 to 18 percent more who plan to do so in the future. Of the owners who acquired the land for residence, 75 percent are now using their holdings for that purpose, and 85 percent will eventually have their land in that use.

Many of the owners who acquired land to use for more than one purpose have either altered their original combination of uses or have not yet developed all of the enterprises planned. Some of these owners, however, still plan to eventually develop their original combinations of enterprises for their holdings.

Few (8 percent) of those who acquired holdings for speculation or with no specific purpose in mind made active use of their holdings. But many more (81 percent) plan to use their land if they retain ownership.

Figures indicate a slight downward trend in number of holdings used for farming (tables 27 and 29). There is also evidence of a shift from farming to residential use. Farm properties near urban centers are being acquired by city people and subdivided for residences. The demand for small holdings for this purpose is quite strong in certain parts of this subregion.

Many owners who originally acquired holdings for recreation have not yet developed them for this purpose. This fact, plus increased pressure from nearby population centers, will tend to augment further the number of holdings in recreational use.

APPENDIX

Ownership Survey Procedure

Conventional methods of obtaining data concerning ownership could not be used in this study because of the large acreage involved. Public records, especially those of assessors and tax collectors, provided much reliable basic data of the kind desired. But the existence of county plat maps showing the land of all owners in the county mapped in place made possible the development of the line-sampling technique used.25/ In utilizing these plat maps, parallel lines spaced 2 miles apart were drawn east and west on quadrangle base maps. Then intercepts of ownership boundaries, as shown on the county plat maps, were marked along these lines. The proportion of the total line traversing an ownership class was taken as the proportion of the total acreage in that particular class. The acreage obtained was an estimate of the true area within each ownership class. This acreage was further classified by measuring the intercepts of the various vegetation and timber stand classifications used in the Forest Survey.

Owners of properties traversed by the sample lines composed the ownership sample. The names of these owners were recorded on cards and all their land holdings were listed. Other related information was then obtained from the property tax rolls. These property records gave the address of the owner, and the acreage, legal description, and assessed value of each parcel of land. This information was used to classify private ownerships and land area by size and individual owners by residence.

To learn how the land was used, how and why the present owner acquired it, why he held it, and his principal occupation, each sample owner was mailed a questionnaire. These were simple, return-stamped, self-addressed questionnaire cards which contained a check list on which questions could be answered readily. Complete replies were received from about a third to half of the owners selected in each county. Information pertaining to land of nonrespondents was obtained by a field follow-up, in which key informants were questioned in local public offices and in communities in which the owners had their land.

All ownership and Forest Survey data were edited and placed on punch cards for machine tabulation. Acreages were then totaled by county, and adjusted if necessary to check with the Bureau of the Census acreages by counties.26/ Estimated acreage figures appearing in the tables were compiled and summarized by means of card tabulating equipment.

25/ Hasel, A. A. and Adon Poli, op. cit., pp. 1-10.

26/ Areas of the United States 1940, U. S. Bureau of the Census. U. S. Govt. Print. Off., Washington, D. C.

Accuracy of Estimate

Estimates of land areas in the various ownership categories are subject to two general types of error: (1) Nonsampling errors in mapping, reporting, canvassing, recording, measuring, and compiling the data, and (2) sampling errors which arise from taking a sample rather than making a complete inventory. Errors of the first type were kept to a minimum by frequent checking and close supervision of all phases of the work. If these nonsampling errors are negligible or compensating, then sampling errors provide measures of the reliability of the acreage estimates and can be computed by statistical methods. Magnitudes of the sampling errors depend on the intensity of the sampling and the variability of the data.

Statistics of land areas presented in this report are subject to increasing sampling errors as the class acreages decrease. A partial range of the sampling errors[27/] by area class are shown below.

Area in class, acres	Standard error, percent
10,000	± 21.0
20,000	± 14.5
40,000	± 10.5
100,000	± 6.5
200,000	± 4.5
500,000	± 3.0
1,000,000	± 2.0
2,000,000	± 1.5
4,000,000	± 1.1

Definition of Terms

Forest land classes

Forest land. Includes (a) lands which are at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; (b) lands from which the trees described in (a) have been removed to less than 10 percent stocking and which have not been developed for other use; (c) afforested areas; and (d) chaparral areas.

Commercial forest land. Forest land which is (a) producing, or physically capable of producing, usable crops of wood (usually saw timber), (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Noncommercial forest land. Forest land incapable of yielding usable crops of wood products (usually saw timber) because of adverse site

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27/ For one calculated error; that is, the chances are 2 in 3 that the calculated acreages would not differ from the class acreages which would be obtained by 100-percent measurement by more than the errors shown.

conditions, or so physically inaccessible as to be permanently unavailable economically, or withdrawn from timber utilization and for special use through statute, ordinance, or administrative order.

Nonforest land. Land that does not qualify as forest land. Includes land which has never supported forest growth; land from which the forest has been removed to less than 10 percent stocking and has been developed for other use, such as grazing, agricultural, residential, or industrial; all land in thickly populated urban and suburban areas; and water classified by the Bureau of the Census as land.

Timber stand classes

Timber type. An extensive area of commercial forest land characterized by a predominant commercial conifer species[28] or group of commercial conifer species. Other vegetation (such as noncommercial conifers[29], hardwoods, and chaparral) and nonvegetation types (such as barren areas) may also occur in subordinate quantities within the same area.

a. Redwood. Areas with redwood comprising 20 percent or more of the commercial-conifer cover. Douglas-fir occurs as the principal associate of redwood throughout this type.

b. Douglas-fir. Areas with Douglas-fir comprising more than 80 percent of the commercial-conifer cover; or mixtures of Douglas-fir and the true firs in which Douglas-fir comprises 20 percent or more of the commercial-conifer cover.

c. Pine--Douglas-fir--Fir. Areas with mixtures of the commercial pines and either Douglas-fir or the true firs in which the pines, Douglas-fir, and true firs each comprise 20 percent or more of the commercial-conifer cover.

d. Fir. Areas with true firs comprising more than 80 percent of the commercial-conifer cover; or mixtures of the true firs and mountain hemlock, or western white pine, in which the true firs comprise 20 percent or more of the commercial-conifer cover.

e. Pine. Areas with ponderosa, Jeffrey, or sugar pine comprising more than 80 percent of the commercial-conifer cover.

28/ Commercial conifer species are redwood, Douglas-fir, ponderosa pine, sugar pine, Jeffrey pine, California red fir, white fir, grand fir, incense-cedar, Port-Orford-cedar, western redcedar, Sitka spruce, western hemlock, western white pine, and mountain hemlock.

29/ Noncommercial conifers are Bishop pine, California torreya, knobcone pine, Brewer spruce, and Pacific yew.

Density classes of commercial-conifer stands on commercial forest land.

a. Dense and semidense. Commercial conifers cover 50 percent or more of the ground space.

b. Open. Commercial conifers cover from 20 to 50 percent of the ground space.

c. Very open. Commercial conifers cover from 5 to 20 percent of the ground space.

d. Nonstocked. Commercial conifers cover less than 5 percent of the ground space.

Stand-size classes

Saw-timber stands. Stands having a minimum net volume per acre of 4,000 board feet, International 1/4-inch rule, in saw-timber trees (11.0 inches d.b.h. and larger for all species).

a. Old-growth saw-timber stands. Saw-timber stands in which more than 50 percent of the net board-foot volume is in mature and overmature saw-timber trees.

b. Young growth saw-timber stands. Saw-timber stands in which 50 percent or more of the net board-foot volume is in immature saw-timber trees.

Pole-timber stands. Stands failing to meet the saw-timber stand specifications, but at least 10 percent stocked with pole-timber and larger trees and with at least half the minimum stocking in pole-timber trees (5.0 to 10.9 inches d.b.h.).

Seedling and sapling stands. Timber stands not qualifying as either saw-timber or pole-timber stands but having at least 10 percent stocking of trees of commercial species and with at least half the minimum stocking in seedlings and saplings (0 to 4.9 inches d.b.h.).

Nonstocked areas. Areas of commercial forest land not qualifying as saw-timber, pole-timber, or seedling and sapling stands.

Tree-size classes

Pole-timber trees. Trees 5.0 inches d.b.h. and larger of commercial species that do not meet the specifications for saw-timber trees but do meet regional specifications of species, soundness, and freedom from defect.

Saw-timber trees. Trees of commercial species that contain at least one merchantable sawlog as defined by regional practice and which are at least 11.0 inches d.b.h. for all species.

Miscellaneous definitions

Annual timber mortality. The net volume removed from live saw timber or growing stock on commercial forest land during a specified year through death from natural causes.

Commercial species. Tree species considered in determining stocking and growing stock. Includes species presently or prospectively usable for commercial timber products, such as minor conifers and hardwoods.

Annual cut. The volume of live saw timber or growing stock removed from commercial forest land during a specified year as timber products and logging residue.

Cull trees. Live trees of saw-timber or pole-timber size that are unmerchantable for sawlogs now or prospectively because of defect or rot.

In commercial conifer species, a tree is considered a complete cull if less than 25 percent of the gross board-foot scale is in merchantable material. Pine logs must be at least 33-1/3 percent sound to be merchantable; other species at least 50 percent. No log scaling less than 30 board feet is considered merchantable.

In hardwood species, a tree is considered cull if less than 40 percent of the gross scale in board feet is in merchantable material. Logs must be at least 50 percent sound to be merchantable.

Trees that are culls on a board-foot basis are also considered culls on a cubic foot basis.

D.B.H. (Diameter breast height). Tree diameter in inches, outside bark, measured at 4-1/2 feet above ground.

International 1/4-inch log rule. A rule for estimating the board-foot volume of 4-foot log sections, according to the formula $V = 0.905 (0.22D^2 - 0.71D)$. The taper allowance for computing the volume in log lengths greater than 4 feet is 0.5 inch per 4-foot section. Allowance for saw kerf is 1/4-inch.

Live saw-timber volume. Net volume in board feet, International 1/4-inch rule, of live saw-timber trees.

Logging residue. The volume of live saw timber or growing stock cut or killed by logging on commercial forest land and not converted to timber products.

Net annual growth. The change during a specified year in the net volume of live saw timber or growing stock on commercial forest land resulting from natural causes.

Detailed Statistics

Table 7.- Major classes of land by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	Total land area		Major classes of land			
			Commercial forest land		Noncommercial forest land	Nonforest land
	Thousand acres	Pct.	Thousand acres	Pct.	Thousand acres	
National Forest	1,429	20.2	1,006	23.8	412	11
Indian land	113	1.6	103	2.4	2	8
Other Federal	199	2.8	98	2.3	93	8
State Park	61	0.9	-	-	57	4
State Forest	50	0.7	48	1.1	2	(1/)
Tax deeded	56	0.8	49	1.2	5	2
Other State	12	0.2	5	0.1	3	4
County and municipal	39	0.6	7	0.2	19	13
Total public	1,959	27.8	1,316	31.1	593	50
Timber operating company	765	10.9	735	17.3	12	18
Timber holding company	180	2.5	171	4.0	5	4
Timber operating individual	119	1.7	106	2.5	9	4
Timber holding individual	472	6.7	426	10.1	32	14
Range livestock farming company	101	1.4	56	1.3	21	24
Range livestock farming individual	1,649	23.4	782	18.5	421	446
Other farmers	767	10.9	219	5.2	172	376
Recreational property owners	291	4.1	155	3.7	100	36
Other classified owners2/	472	6.7	245	5.7	126	101
Unclassified owners3/	273	3.9	27	0.6	31	215
Total private	5,089	72.2	2,922	68.9	929	1,238
All types	7,048	100.0	4,238	100.0	1,522	1,288

1/ Less than 500 acres.

2/ All other land owners whose classification is known but does not logically fit the classes listed above. Examples are owners of land held for residential purposes only, mining claims, watersheds, and reservoir sites.

3/ Small urban, suburban, and industrial ownerships that are too small to map and classify properly, and ownerships that for other reasons cannot be classified and placed in appropriate categories.

Table 8.- Commercial forest land by timber type and by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	Private holdings	All types	Timber type				
			Redwood	Douglas-fir	Pine--Douglas-fir--Fir	Fir	Pine
	Number	Thousand acres					
National Forest	-	1,006	5	740	222	36	3
Indian land	-	103	9	94	-	-	-
Other Federal	-	98	27	70	1	-	-
State Forest	-	48	48	-	-	-	-
Tax deeded	-	49	31	16	1	1	-
Other State	-	5	4	1	-	-	-
County and municipal	-	7	4	3	-	-	-
Total public	-	1,316	128	924	224	37	3
Timber operating company	83	735	667	62	6	-	-
Timber holding company	141	171	135	33	1	2	-
Timber operating individual	196	106	67	36	2	-	1
Timber holding individual	1,201	426	254	157	15	-	-
Range livestock farming company	16	56	28	28	-	-	-
Range livestock farming individual	858	782	272	493	13	-	4
Other farmers	2,317	219	120	97	1	-	1
Recreational property owners	1,989	155	74	80	1	-	(1/)
Other classified owners	3,016	245	153	88	3	(1/)	1
Unclassified	-	27	20	7	-	-	-
Total private	2/9,817	2,922	1,790	1,081	42	2	7
All Owners	-	4,238	1,918	2,005	266	39	10

1/ Less than 500 acres.
2/ This figure represents only those private holdings with commercial forest land.

Table 9.- Commercial forest land by stand-size class and by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	All classes	Stand-size class of timber			
		Old-growth saw timber	Young-growth saw timber	Pole timber	Non-stocked
	Thousand acres				
National Forest	1,006	578	287	30	111
Indian land	103	79	9	2	13
Other Federal	98	47	32	2	17
State Forest	48	7	35	4	2
Tax deeded	49	28	17	1	3
Other State	5	3	2	-	(1/)
County and municipal	7	2	3	(1/)	2
Total public	1,316	744	385	39	148
Timber operating company	735	382	218	87	48
Timber holding company	171	94	64	4	9
Timber operating individual	106	56	39	2	9
Timber holding individual	426	244	136	23	23
Range livestock farming company	56	8	42	2	4
Range livestock farming individual	782	187	460	26	109
Other farmers	219	35	114	10	60
Recreational property owners	155	33	88	8	26
Other classified owners	245	37	138	19	51
Unclassified	27	1	18	2	6
Total private	2,922	1,077	1,317	183	345
All owners	4,238	1,821	1,702	222	493

1/ Less than 500 acres.

Table 10.--Commercial forest land by density of timber stand and by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	All densities	Density of timber stand				
		Dense	Semi-dense	Open	Very open	Non-stocked
	Thousand acres					
National Forest	1,006	270	297	234	94	111
Indian land	103	21	29	20	20	13
Other Federal	98	13	24	35	9	17
State Forest	48	11	12	15	8	2
Tax deeded	49	3	22	15	6	3
Other State	5	3	1	1	(1/)	(1/)
County and municipal	7	1	3	1	-	2
Total public	1,316	322	388	321	137	148
Timber operating company	735	204	232	143	108	48
Timber holding company	171	43	58	47	14	9
Timber operating individual	106	26	38	23	10	9
Timber holding individual	426	111	145	106	41	23
Range livestock farming company	56	11	17	16	8	4
Range livestock farming individual	782	133	207	217	116	109
Other farmers	219	26	40	56	37	60
Recreational property owners	155	16	39	46	28	26
Other classified owners	245	28	49	73	44	51
Unclassified	27	3	5	9	4	6
Total private	2,922	601	830	736	410	345
All owners	4,238	923	1,218	1,057	547	493

1/ Less than 500 acres.

Table 11.- Net volume of live saw timber on commercial forest land by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	Area	Volume	Average volume per acre
	Thousand acres	Million bd. ft.	Bd. ft.
National Forest	1,006	32,559	32,365
Indian land	103	3,551	34,476
Other Federal	98	3,148	32,122
State Forest	48	1,260	26,250
Tax deeded	49	1,461	29,816
Other State	5	366	73,200
County and municipal	7	164	23,429
Total public	1,316	42,509	32,302
Timber operating company	735	31,374	42,686
Timber holding company	171	6,540	38,246
Timber operating individual	106	3,929	37,066
Timber holding individual	426	17,634	41,394
Range livestock farming company	56	1,590	28,393
Range livestock farming individual	782	20,768	26,558
Other farmers	219	4,361	19,913
Recreational property owners	155	3,446	22,232
Other classified owners	245	4,894	19,976
Unclassified	27	508	18,815
Total private	2,922	95,044	32,527
All owners	4,238	137,553	32,457

Table 12.- Number of holdings, privately owned land, and privately owned commercial forest land by major land use, Redwood--Douglas-fir Subregion, California, 1949

Major land use	Holdings			Total land area		Commercial forest land	
						Pct. of total acreage	Pct. of all land in each major use
	Number	Pct.	Av.size acres	Thousand acres	Pct.		
Timber operations	375	2.1	2,051	769	16.0	25.4	95.4
Farming and ranching	7,697	43.0	280	2,159	44.9	29.1	39.0
Recreation	1,848	10.3	87	161	3.3	3.2	57.8
Residence	3,017	16.9	33	99	2.1	2.0	57.6
Other	309	1.7	227	70	1.5	1.4	60.0
Timber operations and farming	142	0.8	2,873	408	8.5	9.4	66.2
Farming and recreation	233	1.3	305	71	1.5	0.9	36.6
Other combinations of 2 or more uses	584	3.3	625	365	7.6	8.8	69.6
No use	3,693	20.6	190	701	14.6	19.8	81.6
All classified owners	17,898	100.0	268	4,803	100.0	100.0	60.2
Unclassified	52	-	-	286	-	-	11.2
All owners	17,950	-	-	5,089	-	-	57.4

Table 13.- Private land holdings by major land use and by size of holding, Redwood--Douglas-fir Subregion, 1949

Size of holding	All uses	Major land use						
		Timber operations	Farming and ranching	Recreation	Residence	Other uses and combinations of 2 or more uses	No use	Unclassified
Acres	Number of holdings							
1 - 179	14,992	207	6,042	1,683	2,951	920	3,138	51
180 - 379	1,322	66	704	103	32	107	310	-
380 - 699	665	28	378	43	27	69	120	-
700 - 1,299	402	21	247	13	6	47	67	1
1,300 - 2,599	305	21	194	5	-	55	30	-
2,600 - 4,999	147	13	91	1	1	31	10	-
5,000 - 9,999	67	5	28	-	-	22	12	-
10,000 - 19,999	35	6	10	-	-	13	6	-
20,000 - 29,999	5	2	2	-	-	1	-	-
30,000 - 49,999	5	3	-	-	-	2	-	-
50,000 and over	5	3	1	-	-	1	-	-
All owners	17,950	375	7,697	1,848	3,017	1,268	3,693	52

Table 14.- Number of holdings, privately owned land, and privately owned commercial forest land, by size of holding, Redwood--Douglas-fir Subregion, California, 1949

Size of holding	Holdings		Total land area		Comm'l. forest land	
					Percent of total acreage	Pct. of all land in each size class
Acres	Number	Pct.	Thousand acres	Pct.		
1 - 179	14,992	83.5	814	16.9	14.1	50.3
180 - 379	1,322	7.4	399	8.3	7.1	51.6
380 - 699	665	3.7	454	9.5	7.9	50.2
700 - 1,299	402	2.2	410	8.5	7.5	52.7
1,300 - 2,599	305	1.7	616	12.8	10.6	50.0
2,600 - 4,999	147	0.8	522	10.8	10.2	56.5
5,000 - 9,999	67	0.4	417	8.7	8.4	58.3
10,000 - 19,999	35	0.2	488	10.1	12.0	70.9
20,000 - 29,999	5		106	2.2	2.7	72.6
30,000 - 49,999	5	0.1	140	2.9	4.7	97.9
50,000 and over	5		447	9.3	14.8	95.8
All holdings	17,950	100.0	4,813	100.0	100.0	60.1

Table 15.- Number of holdings and privately owned commercial forest land by timber type and by size of holding, Redwood--Douglas-fir Subregion, California, 1949

Size of holding 1/	Holdings	All types	Timber type				
			Redwood	Douglas-fir	Pine--Douglas-fir--Fir	Fir	Pine
Acres	Number	Thousand acres					
1 - 179	7,614	409	217	184	7	-	1
180 - 379	935	206	99	103	3	-	1
380 - 699	486	228	109	115	4	(2/)	-
700 - 1,299	303	216	102	106	7	-	1
1,300 - 2,599	242	308	148	155	5	-	(2/)
2,600 - 4,999	126	295	156	138	1	-	-
5,000 - 9,999	62	243	116	116	9	-	2
10,000 - 19,999	34	346	233	110	1	-	2
20,000 - 29,999	5	77	53	21	3	-	-
30,000 - 49,999	5	137	131	4	2	-	-
50,000 and over	5	428	406	20	(2/)	2	-
All classified holdings	9,817	2,893	1,770	1,072	42	2	7
Unclassified	-	29	20	9	(2/)	-	-
Total acreage	-	2,922	1,790	1,081	42	2	7

1/ Size of holding is based on total acreage of all kinds of land owned, only part of which may be commercial forest land.

2/ Less than 500 acres.

Table 16.- Privately owned commercial forest land by stand-size class and by size of holding, Redwood--Douglas-fir Subregion, California, 1949

Size of holding	All classes	Stand-size class of timber			
		Old-growth saw timber	Young-growth saw timber	Pole timber	Non-stocked
Acres	Thousand acres				
1 - 179	409	123	208	17	61
180 - 379	206	62	96	8	40
380 - 699	228	70	113	7	38
700 - 1,299	216	59	111	12	34
1,300 - 2,599	308	120	133	10	45
2,600 - 4,999	295	94	153	15	33
5,000 - 9,999	243	71	129	14	29
10,000 - 19,999	346	145	162	17	22
20,000 - 29,999	77	48	20	5	4
30,000 - 49,999	137	99	26	5	7
50,000 and over	428	185	146	71	26
All classified holdings	2,893	1,076	1,297	181	339
Unclassified	29	1	20	2	6
Total acreage	2,922	1,077	1,317	183	345

Table 17.- Privately owned commercial forest land by density of timber stand and by size of holding, Redwood--Douglas-fir Subregion, California, 1949

Size of holding	All densities	Density of timber stand				
		Dense	Semi-dense	Open	Very open	Non-stocked
Acres	Thousand acres					
1 - 179	409	76	100	115	57	61
180 - 379	206	29	57	50	30	40
380 - 699	228	39	54	66	31	38
700 - 1,299	216	29	59	61	33	34
1,300 - 2,599	308	54	93	76	40	45
2,600 - 4,999	295	54	81	87	40	33
5,000 - 9,999	243	54	59	62	39	29
10,000 - 19,999	346	90	111	78	45	22
20,000 - 29,999	77	29	27	11	6	4
30,000 - 49,999	137	41	51	30	8	7
50,000 and over	428	102	132	90	78	26
All classified holdings	2,893	597	824	726	407	339
Unclassified	29	4	6	10	3	6
Total acreage	2,922	601	830	736	410	345

Table 18.- Net volume of live saw timber on privately owned commercial forest land by size of holding, Redwood--Douglas-fir Subregion, California, 1949

Size of holding	Area	Volume	Average volume per acre
Acres	Thousand acres	Million bd. ft.	Bd. ft.
1 - 179	409	11,444	27,980
180 - 379	206	5,304	25,748
380 - 699	228	6,166	27,044
700 - 1,299	216	5,531	25,606
1,300 - 2,599	308	9,863	32,023
2,600 - 4,999	295	9,379	31,793
5,000 - 9,999	243	7,262	29,885
10,000 - 19,999	346	12,969	37,483
20,000 - 29,999	77	4,082	53,013
30,000 - 49,999	137	6,696	48,876
50,000 and over	428	15,797	36,909
All classified holdings	2,893	94,493	32,663
Unclassified	29	551	19,000
Total acreage	2,922	95,044	32,527

Table 19.- Percentage distribution of privately owned land by type of owner and by size of holding, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	All sizes		Size of holding (acres)										
			1-179	180-379	380-699	700-1299	1300-2599	2600-4999	5000-9999	10,000-19,999	20,000-29,999	30,000-49,999	50,000 & over
	1,000 acres	Pct.	Percent										
Timber operating company	765	100.0	0.9	0.3	0.5	1.7	3.2	5.0	3.4	11.4	6.9	8.6	58.1
Timber holding company	180	100.0	1.6	1.1	5.6	5.6	8.3	18.3	17.8	21.7	-	18.3	1.7
Timber operating individual	119	100.0	8.4	19.2	10.2	9.2	11.8	6.7	10.9	23.6	-	-	-
Timber holding individual	472	100.0	23.5	11.9	9.5	11.0	13.0	5.7	6.6	10.2	-	8.6	-
Range livestock farming company	101	100.0	-	-	2.0	1.0	6.0	19.8	25.7	45.5	-	-	-
Range livestock farming individual	1,649	100.0	3.2	3.5	8.2	11.8	22.1	20.5	14.6	12.9	3.2	-	-
Other farmers	767	100.0	40.0	20.0	15.6	10.8	8.9	2.7	2.0	-	-	-	-
Recreational property owners	291	100.0	45.7	17.5	17.9	8.6	7.6	2.4	0.3	-	-	-	-
Other classified owners	467	100.0	40.7	11.6	15.6	4.1	8.8	6.4	6.8	6.0	-	-	-
All classified owners	4,811	100.0	16.9	8.3	9.5	8.5	12.8	10.8	8.7	10.1	2.2	2.9	9.3

Table 20.- Number of holdings and privately owned land by operating tenure and by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	All tenures		Operating tenure							
			Owner-operated		Leased		Part owner-operated & part leased		Idle	
	Holdings	Land area	Holdings	Land area	Holdings	Land area	Holdings	Land area	Holdings	Land area
	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres
Timber operating company	116	765	111	722	-	-	1	26	4	17
Timber holding company	141	180	9	22	8	5	3	35	121	118
Timber operating individual	220	119	214	110	3	8	-	-	3	1
Timber holding individual	1,236	472	71	83	52	51	2	4	1,111	334
Range livestock farming company	17	101	15	76	1	23	1	2	-	-
Range livestock farming individual	1,118	1,646	992	1,389	75	132	41	110	10	15
Other farmers	6,327	760	5,584	618	573	116	117	21	53	5
Recreational property owners	2,905	283	2,004	185	69	10	57	15	775	73
Other classified owners	5,564	458	3,318	181	564	96	66	43	1,616	138
All classified owners	17,644	4,784	12,318	3,386	1,345	441	288	256	3,693	701
Unclassified	306	305	-	-	-	-	-	-	-	-
All owners	17,950	5,089	-	-	-	-	-	-	-	-

Table 21.- Number of holdings and privately owned land by method of acquisition and by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	All methods		Method of acquisition							
			Purchase		Homestead		Inheritance and gift		Other methods and combinations of 2 or more methods	
	Holdings	Land area	Holdings	Land area	Holdings	Land area	Holdings	Land area	Holdings	Land area
	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres
Timber operating company	116	765	115	761	-	-	1	4	-	-
Timber holding company	141	180	64	150	-	-	57	11	20	19
Timber operating individual	218	118	182	107	10	1	10	4	16	6
Timber holding individual	1,230	470	885	370	38	6	228	71	79	23
Range livestock farming company	17	101	14	93	-	-	2	2	1	6
Range livestock farming individual	1,116	1,646	805	1,185	17	11	172	270	122	180
Other farmers	6,298	760	4,964	544	70	10	919	151	345	55
Recreational property owners	2,945	291	2,597	242	34	5	237	36	77	8
Other classified owners	5,665	471	4,706	312	57	8	681	79	221	72
All classified owners	17,746	4,802	14,332	3,764	226	41	2,307	628	881	369
Unclassified	204	287	-	-	-	-	-	-	-	-
All owners	17,950	5,089	-	-	-	-	-	-	-	-

Table 22.- Number of holdings and privately owned commercial forest land by method of acquisition and by type of owner, Redwood--Douglas-fir Subregion, California, 1949

Type of owner	All methods		Method of acquisition							
			Purchase		Homestead		Inheritance and gift		Other methods and combinations of 2 or more methods	
	Holdings	Land area	Holdings	Land area	Holdings	Land area	Holdings	Land area	Holdings	Land area
	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres	Number	1,000 acres
Timber operating company	83	735	82	731	-	-	1	4	-	-
Timber holding company	141	171	64	144	-	-	57	9	20	18
Timber operating individual	194	106	165	96	9	1	10	4	10	5
Timber holding individual	1,195	424	861	334	34	5	221	63	79	22
Range livestock farming company	16	56	14	53	-	-	1	1	1	2
Range livestock farming individual	854	781	615	574	16	5	123	114	100	88
Other farmers	2,295	217	1,729	153	64	7	324	35	178	22
Recreational property owners	1,985	155	1,749	131	34	4	170	14	32	6
Other classified owners	3,010	245	2,455	165	57	7	341	38	157	35
All classified owners	9,773	2,890	7,734	2,381	214	29	1,248	282	577	198
Unclassified	44	32	-	-	-	-	-	-	-	-
All owners	9,817	2,922	-	-	-	-	-	-	-	-

Table 23.- Privately owned land by method of acquisition and by size of holding, Redwood--Douglas-fir Subregion, California, 1949

Size of holding	All methods	Method of acquisition			
		Purchase	Homestead	Inheritance & gift	Other methods and combinations of 2 or more methods
Acres	Thousand acres				
1 - 179	807	603	27	137	40
180 - 379	397	276	5	78	38
380 - 699	451	324	7	71	49
700 - 1,299	409	293	1	63	52
1,300 - 2,599	614	467	1	92	54
2,600 - 4,999	522	407	-	51	64
5,000 - 9,999	417	301	-	76	40
10,000 - 19,999	488	407	-	50	31
20,000 - 29,999	106	96	-	10	-
30,000 - 49,999	140	140	-	-	-
50,000 and over	447	445	-	-	2
All classified owners	4,798	3,759	41	628	370
Unclassified	291	-	-	-	-
Total acreage	5,089	-	-	-	-

Table 24.- Privately owned commercial forest land by stand-size class and by residence of owner, Redwood--Douglas-fir Subregion, California, 1949

Residence of owner	All classes	Stand-size class of timber: Old-growth saw timber	Young-growth saw timber	Pole timber	Non-stocked
	Thousand acres				
Resident--in the county	1,639	500	778	128	233
Nonresident--outside the county (but within the State)	993	405	449	46	93
Nonresident--outside the State	247	166	65	6	10
All classified owners	2,879	1,071	1,292	180	336
Unclassified	43	6	25	3	9
All owners	2,922	1,077	1,317	183	345

Table 25.- Privately owned commercial forest land by stand-size class and by occupation of owner, Redwood--Douglas-fir Subregion, California, 1949

Occupation	All classes	Stand-size class of timber: Old-growth saw timber	Young-growth saw timber	Pole timber	Non-stocked
	Thousand acres				
Range livestock farmer	731	170	442	26	93
Other farmer	179	33	93	7	46
Timber operator	841	438	257	89	57
Operator of other business	476	210	199	22	45
Professional	63	17	30	4	12
White-collar worker	23	6	10	1	6
Skilled wage earner	39	12	20	3	4
Unskilled wage earner	9	2	5	1	1
Housewife	39	13	16	2	8
Retired	115	35	53	5	22
Other	179	74	73	11	21
All classified owners	2,694	1,010	1,198	171	315
Unclassified	228	67	119	12	30
All owners	2,922	1,077	1,317	183	345

Table 26.- Number of ownerships, total area of privately owned land, and privately owned commercial forest land by purpose of acquisition, Redwood--Douglas-fir Subregion, California, 1949

Purpose of acquisition	All private land				Commercial forest land	
	Ownerships		Land area		Land area	
	Number	Pct.	Thousand acres	Pct.	Thousand acres	Pct.
Timber operations	336	1.9	775	16.4	739	26.0
Sell timber and then farm or graze land	117	0.7	90	1.9	64	2.2
Farming and ranching	7,598	43.5	2,174	46.0	851	29.9
Recreation	2,349	13.4	219	4.6	122	4.3
Residence	3,421	19.6	105	2.2	60	2.1
Resell at a profit	1,546	8.9	384	8.1	337	11.8
Other	603	3.5	205	4.3	144	5.1
Combinations of 2 or more	1,487	8.5	778	16.5	528	18.6
All classified ownerships	17,457	100.0	4,730	100.0	2,845	100.0
Unclassified	493	-	359	-	76	-
All ownerships	17,950	-	5,089	-	2,921	-

Table 27.- Private land holdings by purpose of acquisition, by present land use, and by proposed land use, Redwood--Douglas-fir Subregion, California, 1949

Major land use	Purpose of acquisition		Present land use		Proposed land use	
	Number	Pct.	Number	Pct.	Number	Pct.
Timber operations	336	1.9	375	2.1	1/1,349	7.6
Farming and ranching	7,715	44.2	7,697	43.0	7,605	42.6
Recreation	2,349	13.5	1,848	10.3	2,330	13.0
Residence	3,421	19.6	3,017	16.9	3,635	20.3
Other uses and combinations of 2 or more uses	2,090	12.0	1,268	7.1	2,207	12.4
No planned use	1,546	8.8	2/3,693	20.6	730	4.1
All classified owners	17,457	100.0	17,898	100.0	17,856	100.0
Unclassified	493	-	52	-	94	-
All owners	17,950	-	17,950	-	17,950	-

1/ See table 28 for breakdown of this group by present land use and by purpose of acquisition.

2/ See table 29 for breakdown of this group by purpose of acquisition.

Table 28.- Land holdings of 1,349 owners who plan timber operations as a future use, by present land use and by purpose of acquisition, Redwood--Douglas-fir Subregion, California, 1949

Major land use classes	Present land use		Purpose of acquisition	
	Number	Pct.	Number	Pct.
Timber operations	280	20.7	292	21.6
Farming and ranching	5	0.4	24	1.8
Recreation	5	0.4	11	0.8
Residence	22	1.6	39	2.9
Other uses and combinations of 2 or more uses	9	0.7	99	7.3
No planned use	1,028	76.2	1/835	62.0
Unclassified	-	-	49	3.6
Totals	1,349	100.0	1,349	100.0

1/ These were acquired principally for speculative purposes.

Table 29.- Land holdings of 3,693 owners reporting no present planned use of their land, by purpose of acquisition and by future land use, Redwood--Douglas-fir Subregion, California, 1949

Major land use classes	Purpose of acquisition		Future land use	
	Number	Pct.	Number	Pct.
Timber operations	79	2.1	1,026	27.8
Farming and ranching	303	8.2	192	5.2
Recreation	616	16.7	614	16.6
Residence	446	12.1	600	16.3
Other uses and combinations of 2 or more uses	451	12.2	559	15.1
No planned use	1,427	38.7	702	19.0
Unclassified	371	10.0	-	-
Total	3,693	100.0	3,693	100.0

Table 30.- Private land holdings by original purpose of acquisition, and by present and proposed use of land within each original group of holdings, Redwood--Douglas-Fir Subregion, California, 1949

Major land use	Original purpose of acquisition		Present land use of the original groups		Proposed land use of the original groups	
	Number	Pct.	Number	Pct.	Number	Pct.
Timber operations	336	100.0	229	68.2	291	86.6
Farming and ranching	7,715	100.0	7,068	91.6	7,020	91.0
Recreation	2,349	100.0	1,625	69.2	1,999	85.1
Residence	3,421	100.0	2,572	75.2	2,898	84.7
All holdings with one classified use	13,821	100.0	11,494	83.2	12,208	88.3
Other uses and combinations of 2 or more uses	2,090	100.0	758	36.3	985	47.1
No planned use	1,546	100.0	1,427	92.3	290	18.8
All classified holdings	17,457	100.0	13,679	78.4	13,483	77.2
Unclassified	493	-	-	-	-	-
All holdings	17,950	-	-	-	-	-